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SUMMIT VENTURES NE, LLC.
SUGARBUSH RESORT
WATER QUALITY REMEDIATION PLAN
CLAY BROOK AND RICE BROOK WATERSHEDS
OUTLINE
April 5, 2002

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- Stormwater loading from ski trails, parking lot runoff

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March 7, 2003

Mr. Peter LaFlamme
Supervisor Stormwater Management Section
ANR – Department of Environmental Conservation
Water Quality Division
10 North – 2nd Floor
103 North Main Street
Waterbury, VT 05671-0408

RE: Lincoln Peak, LLC./Summit Ventures, LLC.
Sugarbush Lincoln Peak Development
Warren, Vermont

Dear Pete:

Enclosed please find two copies of the Stormwater Management Narrative prepared by Pioneer Environmental Associates, LLC., for the above-referenced project. In addition, the individual stormwater discharge permit application forms, permit application fee, and two sets of design drawings by Charles Grenier Consulting Engineer , P.C. are being provided for Agency of Natural Resources (ANR) review.

The overall stormwater collection and treatment system for the upgrades of existing parking lots, as well as the proposed Lodge at Lincoln Peak have been designed in accordance with the 2002 ANR Stormwater Management Manual. Following construction of these treatment systems, substantial reductions in existing sediment loading within the Clay Brook and Rice Brook watersheds would occur.

Please contact me with any questions on this material.

Sincerely,

Jeffrey A. Nelson
Principal/Hydrogeologist

JAN/jmw
Enclosures

cc: Friends of the Mad River
Jason Lisai
Charlie Grenier

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LINCOLN PEAK, LLC./SUMMIT VENTURES, LLC.
Warren, Vermont

SUGARBUSH LINCOLN PEAK DEVELOPMENT STORMWATER MANAGEMENT NARRATIVE

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SUGARBUSH LINCOLN PEAK DEVELOPMENT STORMWATER MANAGEMENT NARRATIVE

EXECUTIVE SUMMARY

1. Sugarbush Resort has completed plans for the Lodge at Lincoln Peak, reconfiguration of existing parking lots, additional day skier and employee parking, and associated infrastructure. Stormwater management and treatment design has been a significant element of the planning process for the project.

2. The project area is located in the watersheds of Clay Brook and Rice Brook, both of which are included on the 303(d) list of impaired waters in Vermont, due to sediment. Sediment loading to these water bodies occurs principally as a result of washoff from existing developed areas which do not have stormwater management systems in place.

3. No Total Maximum Daily Load (TMDL) or Watershed Improvement Permit (WIP has been issued to date for Clay or Rice Brooks. Thus, in order to proceed with timely permitting of the proposal, Sugarbush Resort has elected to proceed with an individual stormwater discharge permit application, which includes an offset plan to reduce sediment loading to below existing levels. In addition, Sugarbush Resort continues to work cooperatively with Agency of Natural Resources (ANR) to develop and implement a watershed-wide Water Quality Remediation Plan to address nonpoint sources of sediment loading from lands owned or controlled by the Resort.

4. Stormwater design for the project has been engineered to meet the five criteria by which the 2002 ANR Manual evaluates stormwater control plans. These criteria include water quality, groundwater recharge, channel protection, overbank flood (Q10), and extreme storm (Q100). These criteria would be met through the use of six wet detention ponds, one infiltration basin, stormwater gardens, and swales.

5. Hydrologic modeling has been conducted by Pioneer Environmental Associates, LLC. (Pioneer) to determine subwatershed areas, curve numbers, time of concentration, and peak discharge rates using Natural Resources Conservation Service methods under pre-development and post-development conditions for a range of design storms of 24 hour duration. Results of the modeling indicate that post-development peak flows in Clay Brook, Hotel Brook, and Rice Brook would not be significantly higher than pre-development peak flows. In Hotel Brook, peak flows would decrease significantly under post-development conditions. Hydrologic modeling demonstrated that the proposed stormwater treatment devices would meet the five 2002 ANR Stormwater Management Manual criteria for stormwater runoff treatment.

6. A pollutant offset plan has been designed to reduce loading of the pollutant of primary concern in the Clay Brook and Rice Brook watersheds, which is sediment. Sediment loads (TSS) to Clay Brook and Rice Brook were modeled under pre- and post-development conditions using the "Simple Method". Modeling results indicate that TSS loads to Clay Brook and Rice Brook would decrease under post-development conditions, and the proposed project would not cause or contribute to a violation of water quality in the Clay Brook and Rice Brook watersheds. Therefore, stormwater runoff from the project would comply with the ANR Interim Policy on Individual Permits for Stormwater Discharges, and the 2002 ANR Manual.

7. An erosion and sediment control plan has been prepared by Charles Grenier Consulting Engineer, P.C., the project engineer, with input from Breadloaf Construction and Pioneer. The total area of soil disturbance from the project would be approximately 20 acres. Sugarbush will file an individual permit application for stormwater runoff from construction sites and a notice of intent to seek coverage under General Permit #39001 (2002) with ANR.

8. Iron seeps in areas of saturated soil will be controlled and managed through field identification of risk areas, and where necessary a special limestone fill treatment will be utilized to prevent iron transformation and release in groundwater. Low ph, iron rich fill material will also not be utilized in wet areas.

9. Pioneer is preparing a restoration plan for Hotel Brook, which is currently impacted by sediment loading, channel and streambank instability, and culverts. The proposed reach of Hotel Brook to be restored is 1135 feet in length, and restoration measures will improve bedload movement, habitat for aquatic life, aesthetic value, fish passage, and wildlife habitat in the riparian zone.

10. A stream buffer measuring 50 feet from the top of bank in Clay Brook will be maintained to protect Clay Brook and it's riparian corridor. A Rice Brook stream buffer measuring 50 feet from the edge of the stream channel, and avoidance of further encroachment into the Rice Brook riparian corridor will serve to buffer

Rice Brook. Hotel Brook buffers will be restored, improved, and enhanced as a result of the Hotel Brook restoration plan.

11. Snow removal from plowed parking areas, and associated sediment accumulation will be managed by Sugarbush Resort. No snow plowing will occur in the direction stream buffers and riparian areas. Snow will be temporarily stored in drainage swales and curbed areas adjacent to parking lots. Once these areas have reached their capacity to store snow, snow will be stockpiled in designated locations in the parking lots and will be removed to one of three designated snow storage areas, as needed. Sediment that accumulates in forebays of stormwater treatment basins would be collected and then stockpiled in a designated location away from watercourses or wetlands. The stockpiled sediment will be seeded and mulched to prevent erosion.

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LINCOLN PEAK, LLC./SUMMIT VENTURES, LLC.
Warren, Vermont

SUGARBUSH LINCOLN PEAK DEVELOPMENT STORMWATER MANAGEMENT NARRATIVE

1.0 INTRODUCTION

Summit Ventures, LLC. dba Sugarbush Resort has been working to revise and update re-development plans for the Lincoln Peak base area prepared by the prior owner of the resort. Pioneer Environmental Associates, LLC. (Pioneer) has been engaged by Sugarbush Resort to evaluate sizing of stormwater treatment systems for a proposed Sugarbush Lincoln Peak Development in Warren, Vermont. This analysis has been completed as a component of the Stormwater Discharge Permit application, consistent with the 2002 Vermont Agency of Natural Resources (ANR) Stormwater Management Manual (2002 ANR Manual).

The complete stormwater discharge permit application package includes the following additional components:

- Engineering Design Plans, dated March 2003, by Charles Grenier Consulting Engineer. P.C. (Grenier)

- Permit Application, including WR-82 form, seven Schedule D forms, and application fee

This narrative provides an overview of the basis for design of the stormwater management system designed by Grenier. In addition, an offset plan consistent with current ANR policy has also been prepared, and is described herein.

1.1 Project Overview

The project involves the construction of the Lodge at Lincoln Peak, with a proposed building footprint area of 71,950 square feet, as well as a central plaza area. The project also involves the re-design and reconfiguration of existing parking lots and driveways in the Lincoln Peak base area, the construction of new day skier and employee parking associated infrastructure (wastewater treatment facility, fire house relocation), and the restoration of Hotel Brook. Table 1 provides a summary of the construction status of various project components:

Table 1: Summary of Construction Status

Project Component	Status
Lodge at Lincoln Peak	Proposed; revision of previously approved Grand Summit Hotel
Parking Lots A – D	Existing lots above Village Road; to be reconstructed
Parking Lots E – F	Existing lots below Village Road; to be reconstructed
Village Parking Lot	Existing, to be reconstructed
Parking Lot G	Proposed, below Village Road; minor changes from prior approved plan
Parking Lots H & I	Proposed, at 22 acre site; minor changes from prior approved plan

1.2 Watershed Setting

The project is located in the watersheds of Clay Brook, Rice Brook, and an unnamed tributary of Rice Brook that is referred to as Hotel Brook. Hotel Brook also has a small tributary in the vicinity of the Poma Ski Lift, and this brook is referred to as "Poma Brook". The receiving stream drainage area at the confluence of Clay Brook and Rice Brook is 3.05 square miles. An overall watershed map is provided on page 1 of Appendix 1, showing these areas. Clay Brook and Rice Brook are included on the Vermont 303(d) list of impaired waters, due to sediment.

1.3 Permitting Approach

Because no Total Daily Maximum Load (TMDL) development has occurred for Clay Brook or Rice Brook, and the ANR has not yet issued a Watershed Improvement Permit (WIP) for these waters, Sugarbush Resort has elected to proceed with an individual permit application, coupled with an offset plan to reduce existing sediment loading in the subject watersheds. In addition, Pioneer has been working with Sugarbush Resort in the development of a Water Quality Remediation Plan (WQRP) for these watersheds, to address sediment loading from nonpoint sources which are owned or controlled by the resort.

An outline of the plan was prepared by Pioneer and provided to ANR on May 5, 2002. This application represents partial completion of the WQRP, as it provides hydrologic and sediment loading model results, and proposed retrofits for existing parking lots at the Resort. Until such time as further measures associated with the WQRP or WIP are developed, Sugarbush Resort plans to move forward with the offset measures described herein, which will significantly reduce existing sediment loads to Clay and Rice Brooks, as described in greater detail below.

2.0 STORMWATER RUNOFF ANALYSIS

The proposed Lodge at Lincoln Peak in Warren, Vermont is located at Sugarbush Lincoln Peak base area. The proposed project consists of a three-segment building, a central plaza, and parking lots designated A through G, which will be located on the north side of the Sugarbush Access Road. Parking lots designated H and I are also planned 600 feet south on Inferno Road from the intersection of Inferno Road and Sugarbush Access Road, on the east side of the road, within an area referred to as the "22 acre site". There are currently parking lots in place within much of the proposed project area.

The methodology for hydrologic analysis, used as the basis for design of stormwater structures associated with the proposed Lincoln Peak construction, includes the following components:

1. Determination of subwatershed boundaries using available site topographic maps, U.S.G.S topographic sheets, and Vermont Digital elevation models (DEM) acquired from the Vermont Mapping Program.

2. Determination of subwatershed area, curve number, and time of concentration using Natural Resources Conservation Service (NRCS) methods, for pre-development (existing) and post-development conditions.

3. Determination of peak discharge rates using the NRCS TR20 hydrologic model for pre-development and post-development conditions for a range of design storms of 24 hour duration.

The modeled storm events and associated total rainfall amounts for Washington County, Vermont are provided in Table 2.

Table 2: Rainfall Amounts for Washington County, Vermont	
Frequency	**Rainfall Amount**
1 year, 24 hour	2.20 inches
2 year, 24 hour	2.40 inches
10 year, 24 hour	3.40 inches
100 year, 24 hour	5.40 inches

2.1 Pre-Development Conditions

Pre-development conditions represent watersheds in the proposed project area with natural site conditions, which on Lincoln Peak would be forested. Subwatersheds that are not in the proposed project area are considered existing condition for the pre-development analysis. Pre-development subwatersheds have been modified from the post-development subwatersheds to approximate natural grading. A map of pre-development subwatersheds and cross sections is shown on page 2 of Appendix 1. A summary table of pre-development subwatershed characteristics is provided on page 3 of Appendix 1.

Table 3: Summary of Pre-Development Watersheds		
Name	**Subwatershed Designation**	**Total Area (Acres)**
Clay Brook	C1 – C4	1,412
Rice Brook	R1 – R3	430
Hotel Brook	H1 – H2	73.3
Poma Brook	P1 – P2	35.2

2.2 Existing Subwatershed Characteristics

Currently, the overall watershed draining to the confluence of Clay Brook and Rice Brook consists primarily of forested land, with mountain ski trails creating open areas. Most of this area and the existing developments and

roads therein will remain unchanged. The soils in the area are generally of hydrologic group C for the mountain slopes, and hydrologic group A at the lower elevations in the project area.

At present, much of the project area consists of gravel parking lots at the Sugarbush Lincoln Peak Base area, located north of the intersection of Inferno Road and the Sugarbush Access Road. Clay Brook is located to the south of the base area parking lots, and Rice Brook is to the north. Hotel Brook flows west to east through an existing culvert system beneath the lots.

Existing topography and culverts control runoff routing for the 3.05 square mile watershed. Subwatersheds were created that represent areas of land whose runoff destination is Rice Brook, Hotel Brook, Poma Brook, or Clay Brook. Table 4 provides a summary of existing watersheds within the project area.

Table 4: Summary of Existing Watersheds

Name	Subwatershed Designation	Total Area (Acres)
Clay Brook	C1 – C4	1,400
Rice Brook	R1 – R3	433
Hotel Brook	H1 – H2	63.3
Poma Brook	P1 – P2	54.1

The subwatersheds are named with the first letter of the name of the brook to which they contribute, and a number, with lower numbers generally indicating upstream subwatersheds. This convention will be used to represent other site conditions, unless otherwise noted. Subwatershed outlets were chosen at stream cross sections throughout the project area, where peak flow rates for each site condition are compared.

One existing stormwater detention pond is located on the western downhill side of the Lincoln Peak base area parking lots. Subwatershed P2, consisting of 18.93 acres, is routed with culverts into this pond, which discharges to Hotel Brook. The remaining watersheds generally follow mountain topography, and are not described in this text. A map showing the locations of the cross sections associated with subwatershed discharge points is provided on page 4 of the Appendix 1. Existing subwatershed characteristics are summarized in the table on page 5 of Appendix 1.

2.3 Proposed Subwatershed Characteristics

For the proposed post-development condition, Pioneer has divided the site into subwatersheds based on the proposed stormwater collection system that would direct runoff from impervious surfaces and route it to components of the stormwater treatment system. Other subwatersheds have been designated to account for areas of land between proposed collection areas, where runoff from vegetated or undeveloped areas would flow directly to streams. A map showing the locations of the stormwater ponds and discharge points associated with these subwatersheds is provided in the map pocket. A U.S.G.S. topographical map depicting the stormwater permit application serial numbers (S/N) for discharge points in the proposed project area is provided on page 6 of Appendix 1.

Runoff from Parking Lots A through I would be routed to proposed detention basins associated with the parking lots through a proposed collection system. As shown in the project design plans, Parking Lots A through I would contain large grassed islands (stormwater gardens) where runoff would be allowed to infiltrate and recharge to groundwater, during

low intensity rainfalls. The stormwater gardens will be discussed more in the later section, Proposed Stormwater Treatment and Control.

Those subwatersheds located outside the project area (C1, R1, and P1) would remain unchanged for the post-development model. Other subwatersheds would have the same drainage outlet, but will have total area and overall curve number modified to account for adjusted subwatershed boundaries in the proposed project area. Subwatersheds which are modified from existing conditions, generally represented a small fraction of the proposed project area and have been clipped to allow new subwatersheds to represent the proposed project area. Subwatersheds C2, C3, R2, R3, and H1 have all been modified. Subwatershed C4 largely remains unchanged from existing conditions, except for a 0.47 acre part of proposed gravel parking Lot H that is not in the drainage to wet detention pond 07. Runoff from this site is not collected, and would proceed through overland flow before reaching Clay Brook.

A summary of proposed post-development watersheds is provided in Table 5.

Table 5: Summary of Post-Development Watersheds

Name	Subwatershed Designation	Location Description	Area (Acres)
Clay Brook	C1 – C4	Areas outside project	1393
Clay Brook	PL1	Parking Lots A-C	13.6
Clay Brook	PL2	Parking Lots D - F	5.37
Clay Brook	PL5	Parking Lots H - I	3.02
Rice Brook	R1 – R3	Areas Outside Project	426
Rice Brook	PL3	Parking Lot G	4.08
Rice Brook	PL4	Access Road	2.90
Hotel Brook	H1 – H2	Hotel Brook Watershed	66.6
Poma Brook	P1 – P2	Area Outside Project	35.2

The post-development watersheds, representing the parking lots and other components of the project are described in detail below.

Subwatershed PL1 (S/N 001) would encompass existing gravel parking lots A, B, and C, as well as a portion of land upslope of the gate house base lodge. Runoff would be diverted from this 13.62 acre subwatershed through collection pipes into wet detention basin 01, and then into Clay Brook at stream cross section 002.

Subwatershed PL2 (S/N 002) represents existing gravel parking lots D, E, and F which would be reconstructed, with collection pipes leading to wet detention basin 02. This basin would discharge runoff from the 5.37 acre site into Clay Brook at stream cross section 002.

Subwatershed PL3 (S/N 004) would include proposed gravel parking lot G and area around the existing snowmaking building (CB-1), for a total of 4.08 acres. Runoff from this site would drain through either a series of collection pipes, or a ditch on the northern side of the parking lot into wet pond 04. Pond 04 would discharge to Rice Brook about 130 feet downstream of the Rice Brook and Hotel Brook confluence, and resulting streamflow is analyzed at cross section 007.

Subwatershed PL4 (S/N 005) would receive runoff from a portion of the Sugarbush Access Road starting from the driveway at Sam Ruperts Restaurant and up to near the intersection of the Sugarbush Access Road and Inferno Road. The total subwatershed area of 2.9 acres would be routed to the wet detention basin 05 through a road side ditch, which would then discharge to Rice Brook at stream cross section 007.

Subwatershed PL5 (S/N 007) represents the overflow/employee gravel parking lots H and I at the 22 acre site, and comprises 3.02 acres. Runoff

would be collected through swales and then collection pipes that route the water into wet detention basin 07. This basin would then discharge to overland flow that would reach Clay Brook at stream cross section 003.

Subwatershed H2 (S/N 003) includes the proposed Lodge buildings (rooftops), paved Village parking lot, and the relocated Sugarbush Village road, with a total area of 5.45 acres. A series of collection pipes would direct runoff to detention pond 03, located between the existing snowmaking building (CB-1) and the relocated Sugarbush Village Road. Discharge from pond 03 would discharge to stream cross section 005 at Hotel Brook.

Subwatershed H3 (S/N 006) includes the Center Plaza, and a portion of the rooftop, for a total of 0.72 acres. This uncontaminated runoff would be piped across the relocated Sugarbush Village Road to infiltration basin 06. During storm events the infiltration basin is designed to discharge into Rice Brook at stream cross section 008.

Subwatershed H4 comprises the segment of Hotel Brook and its riparian zone, which would be restored between the Lodge buildings to the north and gravel parking lots to the south. The area of this subwatershed is 0.96 acres. Subwatershed H5 would be the Hotel Brook drainage area downstream of the project area, and is 2.75 acres.

Subwatershed H6 contains an area of land 0.17 acres in size that is in between the PL4 and H2 subwatershed drainages. This runoff would flow into Hotel Brook at cross section 005 through the discharge piping that releases water from detention pond 03. This discharge pipe would have catch basins in the H6 subwatershed.

Post-development subwatershed characteristics are summarized on page 7 of Appendix 1.

2.4 Proposed Stormwater Treatment and Control

The 2002 ANR Manual sets forth five criteria for the design of stormwater treatment systems. These are as follows:

- Water Quality
- Groundwater Recharge
- Channel Protection
- Overbank Flood (Q10)
- Extreme Storm (Q100)

These criteria are all applicable to the proposed Sugarbush Lincoln Peak Development, and the requirements are summarized on page 8 of Appendix 1. Calculations to determine the required Water Quality Volume (WQv), Channel Protection Volume (CPv) and Groundwater Recharge Area or volume (Rea / Rev) are provided on pages 9 through 16 of Appendix 1. WQv design for the ponds is described in the following basin design section. REa design will be summarized in terms of the groundwater recharge allotment for the proposed project area in the watersheds of Clay Brook and Rice Brook, which has Hotel Brook as a tributary. CPv design will be discussed in the hydrologic model results for the stormwater ponds, in a later section. The overbank flood and extreme storm design will also be discussed in the hydrologic model results, in the stream cross section comparison.

Engineering design for the stormwater detention ponds has been completed by Grenier, in accordance with the requirements of the 2002

ANR Manual. A summary of the proposed stormwater treatment systems is provided in Table 6.

Table 6: Summary of Stormwater Treatment Structures		
Structure Number	**Type of System**	**Subwatersheds**
01	Wet Pond	PL-1
02	Wet Pond	PL-2
03	Wet Pond	H2
04	Wet Pond	PL-3
05	Wet Pond	PL-4
06	Infiltration Basin	H3
07	Wet Pond	PL-5

Basis for design summary sheets are provided on pages 17 through 23 of Appendix 1.

Pond 01 is designed to be a wet detention basin that would receive runoff from subwatershed PL1. As a requirement of a wet detention pond, 01 is designed to hold 100 percent of the WQv of 118,251 gallons. The pond would have a permanent water level at 1,559.5 feet, which holds 117,516 gallons, 99.4 percent the WQv requirement, thus meeting the requirement.

Pond 02 would be a wet detention basin meeting the required WQv of 84,858 gallons by maintaining a permanent water volume of 86,534 gallons at 1529.5 feet. Subwatershed PL2 discharges to 02.

Pond 03 would meet the wet detention basin WQv requirement of 82,756 gallons with a permanent water level holding 87,664 gallons. The water level for this pond would be 1,529.5 feet. Runoff from subwatershed H2 flows to 03.

Pond 04 would be a wet detention basin as well, holding 60,455 gallons at a permanent water level of 1,485.8. This meets the required WQv of 60,409 gallons for subwatershed PL3.

Pond 05 would attain the wet detention basin WQv requirement of 19,819 gallons with a permanent water level of 1458.6 feet, holding 20,568 gallons. Subwatershed PL4 would flow to this basin.

Pond 06 would be the only pond on site that is not a wet detention basin. It would have a subwatershed that is different than those for the wet detention ponds in that it would not include any parking lots or roads, and thus would receive uncontaminated runoff. For this subwatershed, the proposed BMP would be an infiltration basin primarily intended to meet the groundwater recharge criterion. Subwatershed H3 would have uncontaminated runoff from a portion of the lodge rooftop and plaza, which would be suitable for infiltration into underlying soils of the permeable hydrologic Unit A. Calculations of required sizing for the REv criterion for subwatershed H3 are provided on page 15 of Appendix 1.

Pond 07 would be a wet detention basin receiving runoff from parking lots H and I in the subwatershed PL5. Maintaining a permanent pond water level of 1,545.0 provides 99.4 percent of the WQv requirement of 51,306 gallons by maintaining 51,016 gallons.

Recharge area requirement compliance has been calculated in terms of recharge area needed for the project in the subwatershed of a brook. The Recharge Area requirement table on page 8 of Appendix 1 shows that a sufficient area of the proposed project would be subject to recharge within each watershed to satisfy the requirements. The runoff is proposed to flow to stormwater gardens or swales in the parking lots within subwatersheds of the three brooks. Here there would be enough

detention time for infiltration to occur. The requirement for Hotel Brook has been added on to Rice Brook because it is a tributary to Rice Brook. The Rice Brook requirement of 2.69 acres would be met with 3.39 acres of area from which runoff would have opportunity to infiltrate. The Clay Brook requirement of 4.14 acres would be exceeded with 13.56 acres of the contributing area being provided an opportunity for infiltration.

2.5 Results of TR20 Modeling

Hydrologic schematics showing the subwatershed routing for pre-development, existing, and post-development are provided on pages 24 and 25 of Appendix 1. Subwatershed curve number and time of concentrations tables for the three site conditions modeled are included on pages 26 through 71 of Appendix 1.

TR20 input and output files for pre-development, existing, and post-development conditions are provided on pages 72 through 90 of Appendix 1. Summary tables providing inflow and outflow rates for proposed stormwater treatment structures, as well as pre- and post-development peak flow rates, for the 1, 2, 10, and 100 year storm events are provided on page 91 of Appendix 1.

2.6 Evaluation of Results at Stormwater Treatment Basins

A discussion is presented for each of the seven basins describing the effect the respective outlet characteristics would have on pond water elevation and outflow, with respect to inflow. Channel Protection Volume (CPv) compliance for the 1 year storm is also investigated by comparing the 1 year storm containment in the pond to the required CPv in addition to WQv. This volume is required to be retained during a 1 year, 24 hour storm in order to protect the downstream channel from erosion. Pond basis for design sheets are provided on pages 16 to 22 of Appendix 1.

During the 1 year storm, wet pond 01 would reduce the peak inflow by 80 percent, using a riser perforation at the permanent water level. The CPv + WQv requirement of 122,784 gallons would be met with a contained water volume of 131,290 gallons. For the 2 and 10 year storms, additional perforations would control outflow rates, with the proposed peak water surface elevation in the pond below the riser outlet elevation of 1,560.5 feet. This would effectively reduce runoff from subwatershed PL1 to 83.3 percent and 90.6 percent of the peak discharge during the respective 2 to 10 year storms. Storms of greater magnitude than the 10 year storm would result in overtopping of the riser, and during the 100 year storm, the spillway located at elevation 1,561.0 feet would be activated. The water surface elevation during a 100 year storm would be 1,561.4 feet, well below the top of berm elevation of 1,563.0 feet.

Wet detention pond 02 receiving runoff from subwatershed PL2 would utilize a perforation at the water level resulting in a 93.0 percent decrease in the peak inflow rate for the 1 year storm. The CPv + WQv volume would be maintained in the pond, holding 105,980 gallons with a requirement of 103,580 gallons. Additional perforations would result in a greater than 90 percent of incoming peak flow for the 2 and 10 year storms, with a maximum water level of 1,530.8 feet during the 10 year storm. During the 100 year storm both the riser and the spillway would be utilized to reduce the peak discharge rate by 63.4 percent with a maximum pond water surface elevation of 1,532.1 feet.

Wet Pond 03 would receive runoff from subwatershed H2, and maintain 148,032 gallons of volume during the 1 year storm, achieving the required CPv + WQv of 129,369. Riser perforations would keep the water level below the riser outlet elevation of 1,532.5 feet for the 1, 2, and 10 year storms, while reducing peak flow rates by over 90 percent. For the 10 year storm, the peak inflow to the pond would be 10.2 cfs, while the peak

outflow would be 0.43 cfs. During the 100 year storm, the high rate of runoff discharge would be controlled using the spillway and riser, and would result in a 58.4 percent decrease from the peak inflow rate and cause a maximum water elevation of 1,533.4 feet in the pond.

Wet detention basin 04 would maintain a volume of 20,570 gallons during the 1 year storm, providing sufficient volume to meet the CPv + WQv requirement of 19,819 gallons. Riser perforations would limit peak discharge out of the pond and maintain a water level below the riser for the 1, 2, and 10 year storms. During the 100 year storm the riser would be activated, resulting in a decrease in peak discharge of 67.1 percent from maximum inflow. The spillway would not be used during the 100 year storm.

Wet detention basin 05 would receive runoff from subwatershed PL4, and is not projected to receive any runoff during the 1 and 2 year storms. PL4 would have a low amount of paved surface and permeable soils in its area, and this would result in infiltration of runoff rather than flow into the detention basin. Due to this the CPv + WQv is the same as the WQv, and therefore is achieved. During the 10 year storm the riser perforation would control water outflow and limit the pond water elevation to the outlet elevation of the riser, 1,459.0 feet. During the 100 year storm the riser would control outflow, and limit the peak water surface elevation in the pond to 1,459.3 feet.

Infiltration basin 06 would have a small volume capacity and the riser would be utilized for the 1, 2, and 10 year storms. The TR20 model has not accounted for infiltration capacity during the storm. During the 100 year storm the spillway would be activated along with the riser and safe water passage would be allowed into Rice Brook, limiting the peak inflow

of 4.65 cfs to 3.67 cfs outflow. The water elevation in the pond would reach 1,546.4 feet, well below the top of berm elevation of 1,548.5.

Wet detention pond 07 would receive runoff from subwatershed PL5, and would hold 80,865 gallons during the 1 year storm. This is enough to meet the required 74,921 gallons for the CPv+WQv. A riser perforation at elevation 1,545.0 controls outflow during the 1 and 2 year storms, reducing the peak inflow rates by up to 98.4 percent. The riser would be the discharge control during the 10 year storm, reducing the peak inflow of 5.2 cfs to 0.84 cfs outflow and allowing a pond water surface elevation of 1,546.2. For the 100 year storm event, the spillway and riser control outflow and allow the passage of water safely through the detention basin, with water surface elevation reaching 1,546.8 feet, below the 1,547.5 feet top of berm elevation.

2.7 Peak Flow Rate Comparison

Peak flow rates at key cross sections for each of the modeled site conditions have been compared to evaluate the hydrology of the receiving streams in the vicinity of the project. Summary tables comparing existing and post-development site condition peak flows to pre-development site condition peak flows with percent changes are given on pages 92 to 93 in Appendix 1.

Pre-development watershed conditions were used to evaluate whether post-development peak flow rates would exceed pre-development peak flow in the streams, for the 10 year and 100 year storms. The requirements for these two storms are known as the Overbank Flood (Q_{10}) and Extreme Storm (Q_{100}), respectively. Following is a comparison at each cross section of the 1, 2, 10, and 100 year storm for each site condition.

Stream cross section 001 is located at Clay Brook just north of the Valley House. There is no development in the subwatersheds draining to this point, and thus no changes in peak flow rates would occur.

Stream cross section 002 is located at Clay Brook just west of Inferno Road crossing. For the 1, 2, and 10 year storms there would be no change between pre-development and the other two site conditions. For the 100 year storm there would be a insignificant increase of 0.6 percent between pre-development and post-development conditions. S/N 001 and S/N 002 are both located at this stream cross section.

Stream cross section 003 is located at Clay Brook to the south of Sam Ruperts Restaurant. There are no changes in streamflow for the 1, 2, and 10 year storms between the site conditions. There would be a slight 0.8 percent increase in flow from pre-development to post-development during the 100 year storm. S/N 007 discharge point is located at this cross section.

Stream cross section 004 is located at Hotel Brook, about 480 feet to the east of the relocated Sugarbush Village Road crossing. Model results indicate that increases in peak streamflow rates have occurred for the 1, 2, 10, and 100 year storm between pre-development and existing conditions with percent increases of 86.2, 146.8, 19.9, and 1.9 percent, respectively, which is likely responsible for existing observed channel erosion. However, as a result of the project, peak discharge rates for these storms for post-development conditions would be reduced to below pre-development condition volumes by –3.4, -4.0, -1.4, and –0.9 percent, respectively. There would be no S/N locations discharging at this point.

Stream cross section 005 is located at Hotel Brook, just east of the relocated Sugarbush Village Road crossing. Increases in peak streamflow

rates for the 1, 2, 10, and 100 year storm between pre-development and existing conditions are projected to have occurred, with percent increases of 89.5, 148.8, 20.0, and 5.7 percent respectively. However, following project construction, there would be only minor changes for these storms between pre-development and post-development of –1.8, -0.8, 0.0, and 7.1 percent, respectively. The peak flow rate for the 100 year storm is projected to increase in streamflow from 106 to 114 cfs. S/N 003 discharges to Hotel Brook cross section 005.

Stream cross section 008 is located at Rice Brook on the east side of the existing Sugarbush Village Road crossing. There would be no change between pre-development and existing site conditions at this cross section. Between pre-development and post-development there is a 3.7 percent increase for the 1 year storm where the discharge increases from 67.2 to 69.7 cfs. This is considered a modeling artifice, since the loss of flow due to infiltration at basin 06 has not been considered. There would be minor increases between pre-development and post-development for the 2, 10, and 100 year storms that account for 1.0, 0.6, and 0.4 percent. S/N 006 is located at this stream cross section.

Stream cross section 007 is located at Rice Brook just to the east of the Sugarbush Access Road crossing. There would be small increases between pre-development and post-development for the 1, 2, 10, and 100 year storms for percent increases of 3.8, 1.0, 0.6, and 2.4 percent, respectively. For the 1 year storm discharge increases from 67.2 to 69.7 and for the 100 year storm the peak discharge increases from 825 to 844 cfs. Nonetheless, these peak discharge rates represent a decrease from existing conditions. S/N 001 and S/N 002 are located at Rice Brook stream section 007.

Stream section 009 is located at the confluence of Rice Brook and Clay Brook. There would be only insignificant increases between site conditions for this cross section. There is no S/N associated with 009.

2.8 Conclusions

The Sugarbush Lincoln Peak Development hydrologic modeling results show that post-development peak flows would not be significantly higher than pre-development peak flows in the stream sections analyzed in Clay Brook, Hotel Brook, and Rice Brook. The modeled post-development peak flows show a significant decrease from the modeled existing peak discharge in the Hotel brook area.

S/N 001 through 007 meet the Vermont ANR Stormwater Treatment Standards of WQv, CPv, Rea, Q_{10}, and Q_{100} by implementing acceptable stormwater treatment practices (STPs) including wet detention ponds, an infiltration basin, stormwater gardens, and swales.

3.0 POLLUTANT OFFSET PLAN

Clay Brook and Rice Brook are both identified as impaired surface waters in the State of Vermont Draft 303(d) List of Waters. These surface water features are tributaries to the Mad River, which also has an impaired segment in Waitsfield, according to the 303(d) List. In order to design a stormwater offset plan as required by the Vermont Agency of Natural Resources (ANR) under the Interim Policy on Individual Permits for Stormwater Discharges (July 26, 2002), Sugarbush Resort Holdings has acquired the services of Pioneer Environmental Associates, LLC. (Pioneer). Pioneer has completed analyses of sediment (TSS) loads in stormwater runoff within the Rice Brook and Clay Brook watersheds to ensure that these requirements are met, and that the proposed Sugarbush Lincoln Peak Development meets the standards set forth by the 2002 Vermont ANR 2000 Manual. Several other intermittent and ephemeral tributaries to Clay

Brook and Rice Brook are also present in the study area (see pages 1 and 2 of Appendix 2). This memorandum summarizes the methods and assumptions used to compute TSS loads from the Lincoln Peak segment of the Clay Brook and Rice Brook watersheds under the following scenarios:

1. Existing Site Conditions: Includes pollutant loads from runoff associated with the existing developed land areas in the Clay Brook and Rice Brook watersheds.

2. Proposed Conditions: Includes pollutant loads from runoff associated with developed areas in the Clay Brook and Rice Brook watersheds under the conditions proposed by the Sugarbush Lincoln Peak Development.

The project design engineer, Charles Grenier Consulting Engineer, PC Grenier of Waterbury, Vermont, has provided Pioneer with project design details, and Pioneer has worked with Grenier in the determination and evaluation of stormwater treatment devices for the project in order to ensure pollutant removal capabilities in accordance with the 2002 ANR Stormwater Treatment Standards, and which would meet the ANR Interim Policy requirements of no contribution to a violation of water quality standards and no net increase in loading or concentration of pollutants of concern to impaired waters.

3.1 Existing Watershed Conditions

The 303(d) listing information for Clay Brook and Rice Brook is summarized as follows:

Clay Brook:

- Waterbody ID: VT08-20

- Segment Name/Description: Clay Brook, Inferno Road (0.1 miles)
- Pollutants: Sediment, Iron
- Use(s) Impaired: ALS
- Surface Water Quality Problem(s): Soil erosion construction activities and gravel parking lot; increased peak stormwater flows
- Current Status/Situation: Poor biological condition (96 and 2000), no monitoring data on pollutants, needs additional assessment, 6 stormwater basins, modify parking areas and iron seep remediation (98-99)
- TMDL Completion Year/State Lead: 2007 DEC-WQ

Rice Brook:

- Waterbody ID: VT08-20
- Segment Name/Description: Rice Brook
- Pollutants: Sediment
- Use(s) Impaired: ALS
- Surface Water Quality Problem(s): Erosion from upstream areas in watershed and parking lot, land development
- Current Status/Situation: Embeddedness, poor biological condition (93) and fair (2000), stormwater basins, modify parking areas, iron seep plan implemented (98-99)
- TMDL Completion Year/State Lead: 2006 DEC-WQ

Based on the 303(d) listing, and the Vermont Water Quality Standards (VWQS 1999), the primary constituent of concern for Clay Brook and Rice Brook is sediment. Therefore, the relevant analytical constituents for which loadings associated with stormwater runoff from the project site are as follows:

- Sediment: Total Suspended Solids (TSS)

3.2 Proposed Watershed Conditions

The proposed Lincoln Peak Development would result in the reconstruction of existing gravel parking lots, the paving of certain roads and parking areas, and the construction of the Lodge at Lincoln Peak. All of the stormwater runoff from the proposed parking lots and hotel/conference center would be collected and treated in wet detention ponds. Most of the project is proposed in areas that are already developed as gravel parking lots. A previously impacted segment of Hotel Brook (a tributary to Rice Brook) would be rerouted and restored to accommodate construction plans. The method of pollutant load analyses, land use categories utilized for the analyses, and pollutant load changes in the Clay Brook and Rice Brook watersheds are described below.

3.3 Loading Analysis Methodology

For the purposes of this study, 25 different stormwater drainage areas were delineated within the Clay Brook and Rice Brook watersheds to identify discrete areas that contribute significant volumes of stormwater runoff. The stormwater drainage area boundaries were identified based on the presence of a high percentage of impervious cover, as-built and proposed drainage patterns, natural watershed boundaries, and parcel boundaries. The number of delineated stormwater drainage areas remains constant under both the existing and proposed conditions, but in some cases the stormwater drainage area boundaries change between the two conditions. Pages 1 and 2 of Appendix 2 depict stormwater drainage area boundaries under existing and proposed conditions.

Stormwater drainage area boundaries for pre- and post-development conditions were digitized from VT Digital Orthographic Quad (DOQ) # 120180 (1995) using ArcView 3.2 software. Impervious cover map layers, for pre- and post-development conditions, were created using the DOQ

and detailed site plans provided by Grenier. The stormwater drainage area and impervious cover map layers were combined by geoprocessing to generate maps and data tables that were used to calculate TSS loading.

TSS loads have been computed using the "Simple Method" of Schueler 1987. This empirical method is intended to provide reasonable estimates of annual TSS loads, from which decisions are made regarding the appropriate nonpoint source management approaches.

The formula used for the Simple Method is provided below:

$$L = 0.226 * (P * Pj * (0.05 + 0.9*Ia)) * C * A$$

Where:

L = load (pounds/year)

0.226 = conversion factor

P = annual precipitation (inches) [42.0 inches for Sugarbush Lincoln Peak]

Pj = 0.9 (correction factor based on 10 percent of storms not producing any runoff)

Ia = percent impervious cover

C = mean concentration for TSS (mg/l) [dependent on land use; see below]

A = contributing area (acres)

The calculation of 0.05 + 0.9*Ia produces a value for the runoff coefficient (Rv). The runoff coefficient value varies between different stormwater drainage areas because it is directly related to the percent impervious cover (Ia) of a given stormwater drainage area. The Rv value is multiplied

by the annual precipitation value (P) and the correction factor (Pj) to obtain the annual runoff (R) from a stormwater drainage area in inches/year. Pages 3 through 6 of Appendix 2 include calculations of TSS loads in the Clay Brook and Rice Brook watersheds.

The concentration of TSS in runoff (C) varies between stormwater drainage areas depending on the land use category. The New York State Department of Environmental Conservation (NYSDEC) Stormwater Management Design Manual – Draft (NYSDEC 2001a) was the reference for C values used in this study, which are included in the tables on pages 3 to 6 of Appendix 2. Page 7 of Appendix 2 lists the percent removal efficiency of various stormwater control devices.

The land use categories for this study were derived from on-site investigation, professional judgment, and existing map data. The land use categories that were assigned to individual stormwater drainage areas in this study include: commercial, parking, urban, and medium density residential. Areas identified as commercial land are business land uses that have impervious surfaces such as parking lots, sidewalks, and rooftops. Urban land includes recreational areas such as parks and tennis courts. All residential land uses in the area were assigned to the medium density residential land use category. All calculations and assumptions made in modeling TSS loads are subject to revision pending field verification in the Spring, Summer, and Fall of 2003.

3.4 Loading Analysis Results

The results of TSS load analyses under existing and proposed conditions are included on pages 3 to 6 of Appendix 2. The results show that under existing conditions, the Sugarbush Resort parking areas contribute 15,726 lbs/year of TSS. This load would be reduced to 4,895 lbs/year under

proposed conditions. Loads from other Sugarbush owned or controlled sites remains approximately the same at 11,281 lbs/year under existing conditions and 11,411 lbs/year under proposed conditions. The slight increase in TSS load is attributed to changes in stormwater drainage boundaries under proposed conditions rather than any significant site alteration or changes in these areas. There is a negligible increase (from 21,405 to 21,466 lbs/year) in TSS loads from other privately owned sites under proposed conditions, also resulting from changes to stormwater drainage area boundaries. Table 7 provides an overall summary of the total TSS load to Clay Brook and Rice Brook by property ownership.

Table 7: Summary of Total TSS Load (lbs/year) to Clay Brook and Rice Brook By Property Ownership

Condition	Sugarbush Owned Sites*	Other Privately Owned Sites	Total
Existing	**27,007**	**21,405**	**48,412**
% of Total	55.8	44.2	100
Proposed	**16,306**	**21,466**	**37,772**
% of Total	43.2	56.8	100
% of Existing Load	60.3	100.3	78.0

*Includes Upper Sugarbush Village 1 through 5

Table 7 and pages 3 and 4 of Appendix 2 indicate that under proposed conditions the total TSS load to the Clay Brook and Rice Brook watersheds would significantly decrease as a result of the stormwater retrofits associated with the Sugarbush Lincoln Peak Development. Sites owned and controlled by Sugarbush Resort show a reduction in TSS loads from 27,007 to 16,306 (60.3 percent of the original load). When considering TSS loads from all stormwater drainage areas regardless of ownership, the reduction would be 78.0 percent of the original load of 48,412 lbs/year.

Tables 5 and 6 and pages 5 and 6 of Appendix 2 provide further analysis of TSS loads in the Rice Brook and Clay Brook watersheds under existing

and post-Lincoln Peak Development conditions. Table 8 shows TSS loads to Rice Brook from Sugarbush owned or controlled sites to be 58.5 percent of the original load under proposed conditions (a reduction from 22,896 lbs/year to 13,391 lbs/year).

Table 8: Summary of TSS Load (lbs/year) To Rice Brook By Property Ownership

Condition	Sugarbush Owned Sites*	Other Privately Owned Sites	Total
Existing	**22,896**	**14,493**	**37,390**
% of Total	61.2	38.8	100.0
Proposed	**13,391**	**14,541**	**27,932**
% of Total	47.9	52.1	100
% of Existing Load	58.5	100.3	74.7

*Includes Upper Sugarbush Village 1 through 5

TSS loads to Rice Brook from all stormwater drainage areas in the watershed regardless of ownership would be 74.7 percent of the existing load (a reduction from 37,390 lbs/year to 27,932 lbs/year).

Table 9 shows TSS loads to Clay Brook from Sugarbush owned or controlled sites to be 70.9 percent of the original load under proposed conditions (a reduction from 4,110 lbs/year to 2,915 lbs/year). TSS loads to Clay Brook from all stormwater drainage areas regardless of ownership would be 89.3 percent of the existing load (a reduction from 11,022 lbs/year to 9,840 lbs/year).

Table 9: Summary of TSS Load (lbs/year) To Clay Brook By Property Ownership			
Condition	**Sugarbush Owned Sites***	**Other Privately Owned Sites**	**Total**
Existing	**4,110**	**6,912**	**11,022**
% of Total	37.3	62.7	100
Proposed	**2,915**	**6,925**	**9,840**
% of Total	29.6	70.4	100
% of Existing Load	70.9	100.2	89.3

*Includes Upper Sugarbush Village 1 through 5

Sugarbush has partnered with the Mad River Valley Planning District (MRVPD) to seek funding for the design and implementation of additional stormwater retrofits in the Upper Sugarbush Village area with technical guidance from Pioneer. Completion of the project is contingent on the approval of funding from a U.S. Environmental Protection Agency Section 319 Grant. The stormwater drainage areas identified as Upper Sugarbush Village 1 through 5 will be targeted as the areas to be retrofitted with stormwater treatment devices, which may include wet detention basins, treatment swales, sediment traps, and regrading of existing driveway catch basins. Additional reductions in the total TSS load to Rice Brook from Sugarbush owned and controlled sites would be obtained with the implementation of this plan.

3.5 Summary

In conclusion, these offset analyses demonstrate that the completion of the Sugarbush Lincoln Peak Development would not cause or contribute to a violation of water quality, and will not increase the loading of the pollutant of primary concern (TSS) within the Clay Brook and Rice Brook watersheds as identified on the 2000 303(d) list. As shown above, sediment loading to each of these water bodies would be reduced through the redesign of existing parking lots to include stormwater controls

consistent with the 2002 ANR Manual. Additionally, contingent on Section 319 Grant funding, the implementation of additional stormwater retrofits in the Upper Sugarbush Village area would further reduce TSS loads to Rice Brook. Thus, based upon project construction, operation, and maintenance, in accordance with the engineering plans developed by Grenier and permit conditions specified by ANR, it is Pioneer's conclusion that stormwater runoff from the project will comply with the ANR Interim Policy on Individual Permits for Stormwater Discharges, and the 2002 Vermont ANR Stormwater Management Manual.

4.0 IMPLEMENTATION

4.1 Erosion and Sediment Control

A detailed and site specific construction sequence for the building construction and parking lot construction has been prepared by Breadloaf Construction. Using this sequence, an erosion and sediment control plan and narrative has been prepared by Grenier, with input from Breadloaf and Pioneer. The total soil area of soil disturbance associated with the entire project, which is planned to be constructed over a 30 month period, would be approximately 20 acres, including significant previously disturbed areas associated with existing parking lots and drives which would be reconstructed as a part of the project. Given the timing and nature of project-related construction activities, both an individual permit application for stormwater runoff from construction sites, as well as a notice of intent to seek coverage under General Permit #3-9001 (2002) will be filed with ANR. These applications and associated plans and narratives will be filed in the near future.

4.2 Iron Seep Control Plan

To avoid the occurrence of iron seeps in the future, resulting from disturbance, reworking, or fill placement in areas of saturated soils, the following measures would be implemented as a part of project construction. The most important premise is that low pH iron-rich glacial till soils must not be used as fill materials that are placed in direct contact with soils where saturated ground conditions are to be expected.

The implementation of the Iron Seep Control Plan is as follows:

1. At risk areas will be identified in the field prior to construction and as construction proceeds within each specific area of construction disturbance. Generally, these areas will include locations of wet soils, seeps and springs, and areas of water ponding where the placement of fill is proposed.

2. Following identification of these areas, confirmation of the necessity and extent of special fill treatment will be made with project erosion control specialist.

3. Within each of these areas, native topsoil materials will be removed to a depth of at least 2 feet below native ground surface.

4. These zones will then be backfilled with unwashed crushed limestone of 3/4 inch or smaller size to original ground surface elevation.

5. As needed, provisions will be made for the drainage of groundwater within the soil replacement area. This will be determined on a case-by-case basis and may include a gravel pad,

additional crushed limestone, or drainage pipe downslope of the treatment area.

6. A continuous layer of geotextile fabric will then be placed over the limestone materials throughout each treatment area.

7. Common fill material will then be placed to achieve grades as specified by proposed site plans.

The implementation of this plan will ensure the avoidance of the key element which leads to the occurrence of iron seeps, namely the placement of iron-rich fill materials below the water table where iron transformations and release can occur.

4.3 Hotel Brook Restoration

The proposed stream restoration reach of Hotel Brook is about 1135 feet in length. Approximately 38 percent (420 feet) of this stream reach is currently culverted (as shown on page 1 of Appendix 2). The proposed restoration plan provides a day lighted channel, which will be designed and constructed using natural channel design principles. The removal of the culvert and the construction of a natural channel are expected to result in the following:

- Improved sediment transport
- Habitat for aquatic life
- Aesthetic value
- Improved fish passage
- Wildlife habitat within the riparian zone

A detailed design report is being prepared by Pioneer and will be submitted under separate cover.

4.4 Stream Buffer Protection

Stream buffers will be maintained or improved along three intermittent and perennial streams that run across the project site, Hotel Brook, Rice Brook, and Clay Brook.

Rice Brook runs through a narrow forested corridor that is currently abutted by a mowed grass strip and unpaved parking area to the south, and the Sugarbush Village to the north. Two pedestrian bridges cross Rice Brook as an access route to the Sugarbush Village. The channel is incised for most of its length, but where the mowed grass strip is present adjacent slopes are less steep. Under existing conditions the forested Rice Brook buffer and mowed grass strip would not be compromised as a result of the Lincoln Peak Development, and development will not encroach significantly closer Rice Brook than any existing structures or parking areas. A minimum 50 foot setback will be maintained from the edge of the Rice Brook channel, and no impacts will occur within the area that has been identified as the top of bank.

The Clay Brook corridor is in a more natural setting than Rice Brook. Clay Brook runs through a hemlock-northern hardwood forest community, and the channel is significantly incised in most areas. The watercourse has limited floodplain area due to the steep slopes adjacent to the stream. Within the area identified as the top of bank corridor wetlands are present, particularly along the south bank of Clay Brook where seepage wetlands are present. Any development associated with the Lincoln Peak project will occur at least 50 feet from the mapped top of bank area, thus allowing a substantial riparian buffer to Clay Brook.

Hotel Brook (a tributary to Rice Brook) currently runs through the approximate center of the project site, and has previously been significantly impacted. Under existing conditions, the upper reaches of

Hotel Brook are adjacent to a ski trial and culverted in two locations for a total distance of 120 feet. The middle section of Hotel Brook is culverted under an existing parking lot for 295 feet. The lower reaches of the brook are abutted by a gravel parking lot on the south side, with the toe of the parking lot fill extending right up to the edge of the stream channel.

Under proposed conditions, the condition of Hotel Brook and its riparian buffer will improve significantly. At the upper reaches of the brook, the culverted length will be significantly reduced, and the channel and riparian buffer will be restored. The middle reaches of Hotel Brook will be relocated to replace the existing segment that is culverted for 295 feet. Establishment of a significant riparian buffer will be part of the restoration of this section of the brook. The channel of the lower reaches of the brook will be relocated and enhanced, and a riparian buffer will be established on the south side of Hotel Brook. The condition of Hotel Brook and its riparian buffer will be significantly improved under proposed conditions.

4.5 Snow Management Plan

Sugarbush Resort proposes to implement the following plan for snow management in the Lincoln Peak Base Area.

Parking Lots A, B, C, D, E and F:

- No snow plowing will occur toward the South, in the direction of Clay Brook and buffer area.
- Initially, snow will be plowed into the drainage swale areas to the East and West of the lots and onto curbed areas.
- Once these swale areas have reached capacity and cannot provide additional snow storage, surplus snow will be plowed into designated stockpile locations within the parking lot.
- This surplus snow will then be removed to designated storage areas, as needed.

Parking Lot G (East of Control Building #1)

- No snow plowing will occur toward the North, in the direction of the Rice Brook tributary, and no snow plowing will occur towards the South, in the direction of Clay Brook.
- Initially, snow will be plowed into the stormwater detention pond to the East, the drainage swales to the East and West of the lot, and onto curbed areas.
- Once these areas have reached capacity and cannot provide additional snow storage, surplus snow will be plowed into designated stockpile locations within the parking lot.
- This surplus snow will then be removed to designated storage areas, as needed.

Village Parking Lot:

- No snow plowing will occur toward the North, in the direction of Rice Brook.
- Initially, snow will be plowed to the perimeter of the lot and placed onto curbed areas.
- Once these areas have reached capacity and cannot provide additional snow storage, surplus snow will be removed to designated storage areas, as needed.

Parking Lots H & I (22 Acre Site):

- No snow plowing will occur toward the stream tributaries that cross the site, and no snow plowing will occur toward Clay Brook to the North.
- Snow will be plowed to and stored in the southeast corner of Lot I.

Snow Storage Plan

The following areas are designated as locations for disposal of surplus snow which is removed from parking lots.

- 22 Acre Site located off Inferno Road.
- Parcel 9, off the Sugarbush Access Road at the end of the Warren House's driveway.
- Parcel B, North of the Sugarbush Access Road near the Golf Course Road intersection, formerly known as the Long Parcel.

- Stormwater treatment basins (forebay areas only) to the extent that any snow placed in these areas is removed prior to March 15th.

These areas are shown on the vicinity map provided on page 8 of Appendix 2.

4.6 Sediment Management Plan

Sediment that accumulates in forebay sections of stormwater treatment basins will be periodically removed and stockpiled to prevent offsite migration as TSS in stormwater. The stockpiled sediment will be seeded and mulched to prevent erosion problems, and will be located away from wetlands and surface water features. The sediment may be stored at the 22 acre site, at Parcel 9 off of Sugarbush Access Road, or on Parcel B north of Sugarbush Access Road.

REFERENCES

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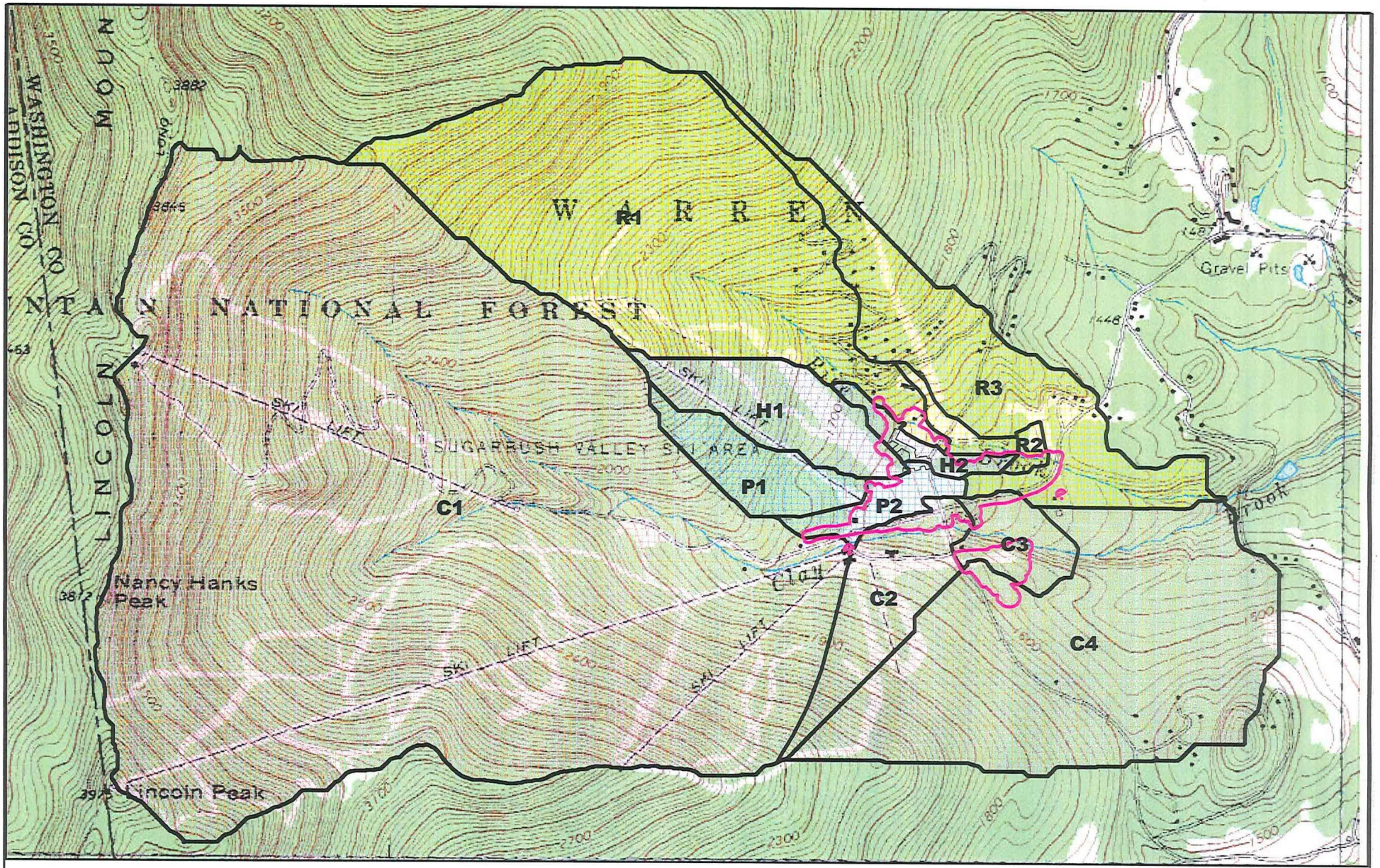

Overall Watershed and Project Area
Sugarbush Lincoln Peak

March 6, 2003

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ush Lincoln Peak Base Area
Pre-Development
nd Rice Brook Watersheds

March 6, 2003

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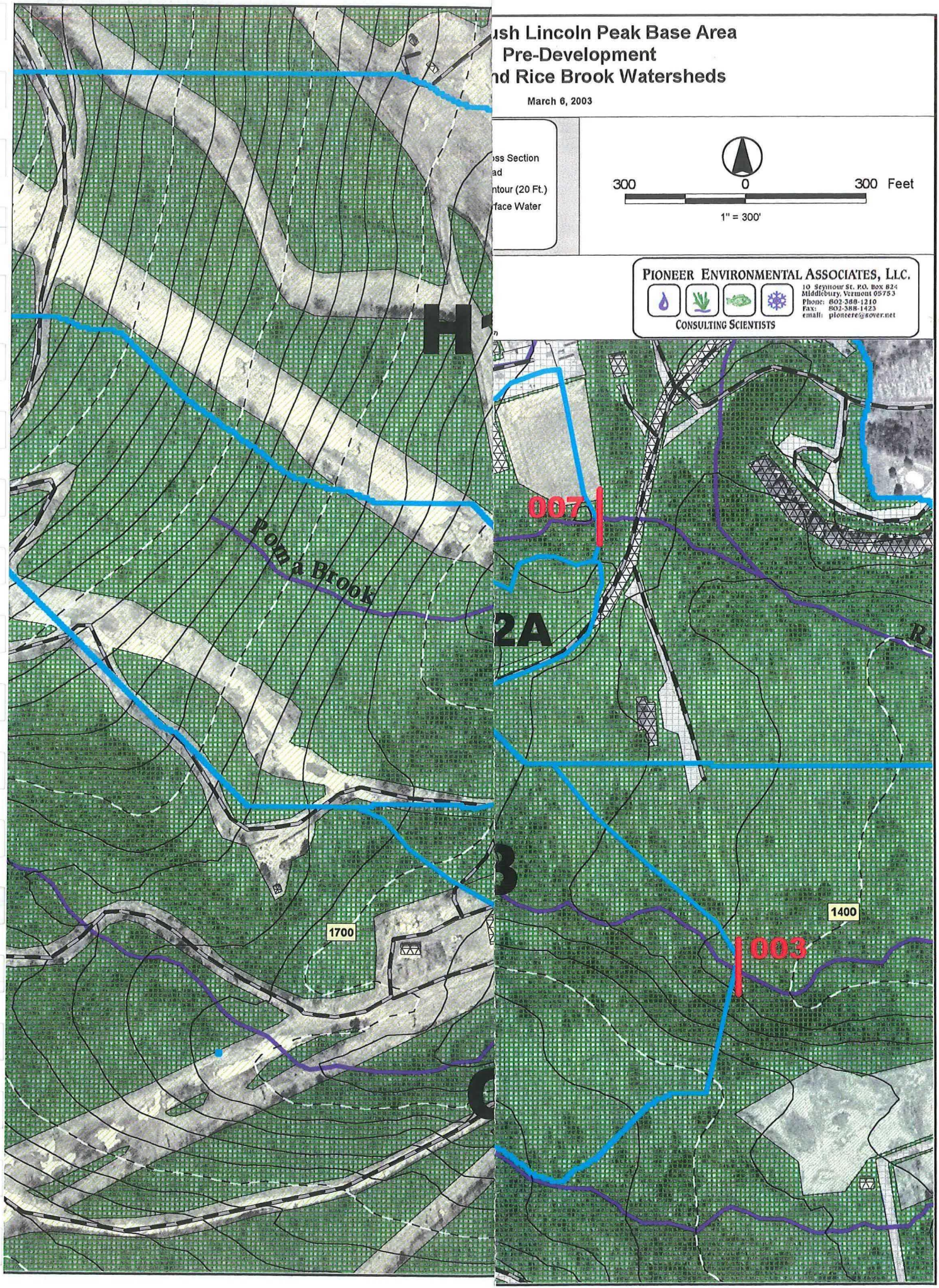
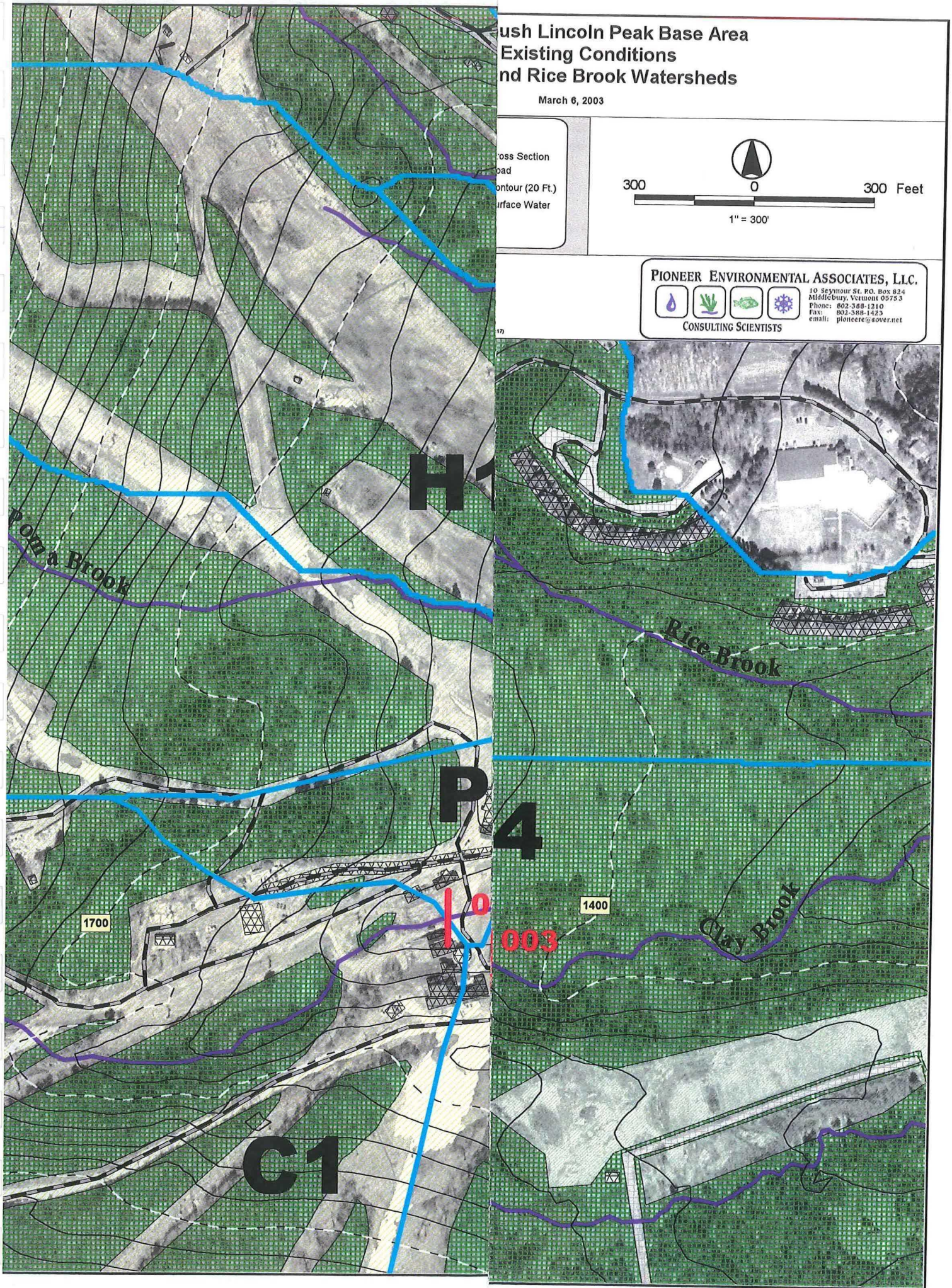


Sugarbush Lincoln Peak Development March 2003 Pre Development Conditions				
Sub-Watershed	Area (square miles)	Area (Acres)	Curve Number	Time of Concentration (hours)
C1	1.66	1063	70.8	0.470
C2	0.0782	50.0	70.7	0.231
C2A	0.0244	15.6	33.0	0.190
C3	0.0334	21.4	31.5	0.135
C3A	0.00472	3.02	46.0	0.102
C4	0.404	258.6	60.4	0.368
H1	0.0884	56.6	57.9	0.214
H2	0.00150	0.960	30.0	0.0955
H3	0.0140	8.97	30.0	0.137
H4	0.00629	4.02	30.0	0.0909
H5	0.00430	2.75	31.8	0.0988
P1	0.0550	35.2	46.5	0.255
R1	0.466	298	69.8	0.331
R2	0.0176	11.3	48.6	0.307
R2A	0.00582	3.72	30.0	0.144
R3	0.183	117	56.7	0.459
Total:	3.05	1951		

Brook Watershed Area Subtotals		
Brook	Total Area (acres)	Subwatersheds
Clay	1412	C1,C2,C2A,C3,C3A,C4
Hotel	73.3	H1,H2,H3,H4,H5
Poma	35.2	P1
Rice	430	R1,R2,R2A,R3
Total	1951	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Existing Conditions
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March 6, 2003
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PIONEER ENVIRONMENTAL ASSOCIATES, LLC.
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H1
Rice Brook
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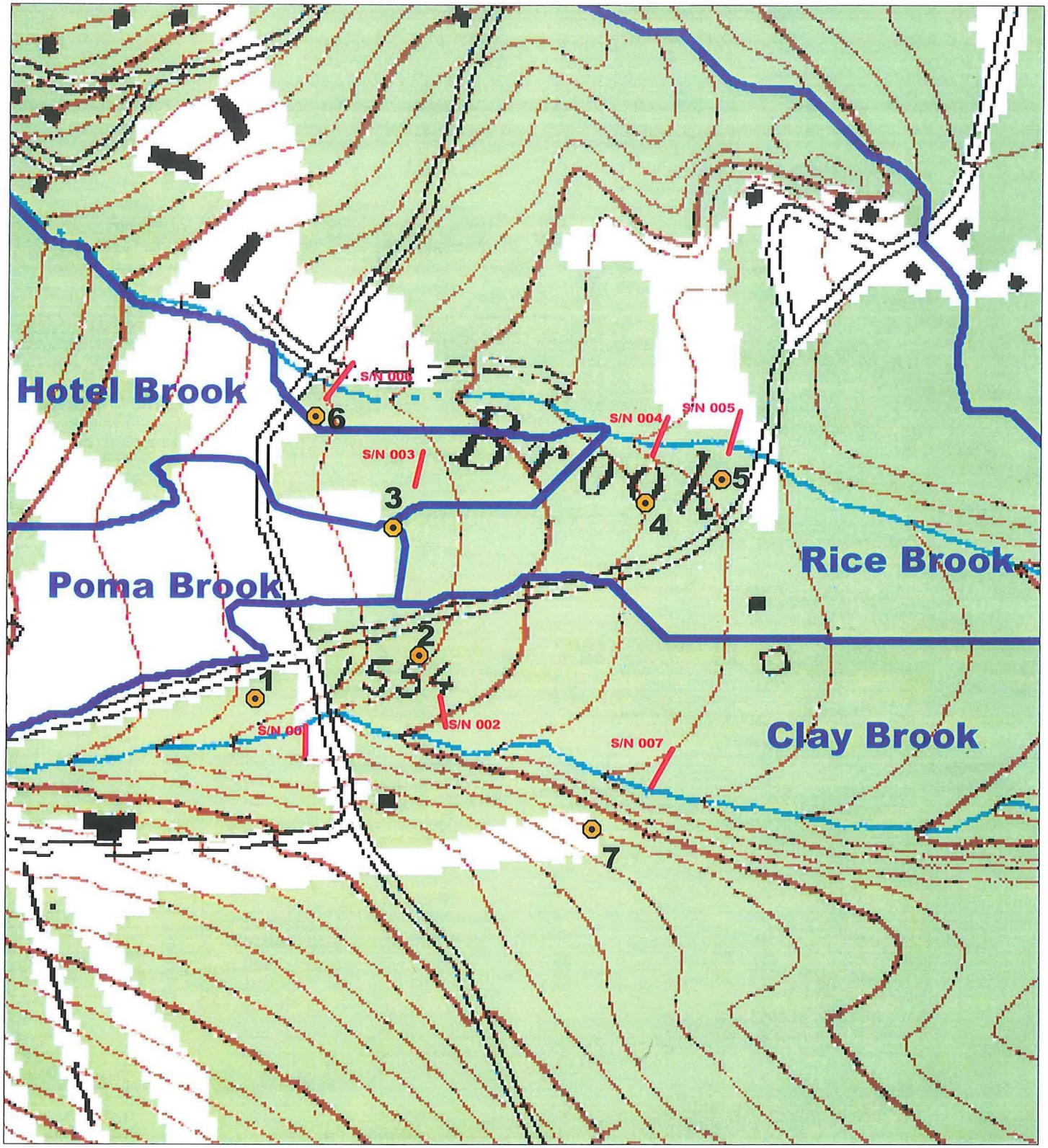
Clay Brook
C1

Sugarbush Lincoln Peak Development March 2003 Existing Conditions				
Sub-Watershed	Area (square miles)	Area (Acres)	Curve Number	Time of Concentration (hours)
C1	1.66	1063	70.8	0.470
C2	0.0819	52.4	69.8	0.230
C3	0.0390	25.0	36.4	0.135
C4	0.405	259	60.5	0.368
H1	0.0798	51.1	60.1	0.214
H2	0.0191	12.2	37.4	0.183
P1	0.0550	35.2	46.5	0.255
P2	0.0296	18.9	58.7	0.206
R1	0.467	299	69.8	0.331
R2	0.0193	12.4	46.9	0.307
R3	0.191	122	55.8	0.458
Total:	3.05	1951		

Brook Watershed Area Subtotals		
Brook	Total Area (acres)	Subwatersheds
Clay	1400	C1,C2,C3,C4
Hotel	63.3	H1,H2
Poma	54.1	P1,P2
Rice	433	R1,R2,R3
Total	1951	

Sugarbush
Lincoln Peak Base Area
Stormwater Discharge Point Locations

March 6, 2003



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Stormwater Treatment Basin

Major Watershed

S/N Discharge Serial Number

F:\PROJECT\02085 Sugarbush LP Development\GIS\sugarbush_lp (site map)

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Sugarbush Lincoln Peak Development March 2003 **Post Development Conditions**				
Sub-Watershed	Area (square miles)	Area (Acres)	Curve Number	Time of Concentration (hours)
C1	1.66	1063	70.8	0.470
C2	0.0768	49.2	70.8	0.230
C3	0.0347	22.2	34.1	0.135
C4	0.404	259	60.5	0.368
H1	0.0884	56.6	57.8	0.214
H2	0.00851	5.45	75.5	0.104
H3	0.00113	0.720	97.3	0.0833
H4	0.00149	0.960	40.1	0.0519
H5	0.00430	2.75	31.0	0.0963
H6	0.00027	0.170	56.3	0.0315
P1	0.055	35.2	46.5	0.255
PL1	0.0213	13.6	55.0	0.181
PL2	0.00839	5.37	66.0	0.145
PL3	0.00638	4.08	66.3	0.112
PL4	0.00454	2.90	48.1	0.144
PL5	0.00472	3.02	74.4	0.115
R1	0.466	298	69.8	0.331
R2	0.0176	11.3	51.0	0.307
R3	0.183	117	56.9	0.458
Total:	3.05	1951		

Brook Watershed Area Subtotals		
Brook	Total Area (acres)	Subwatersheds
Clay	1415	C1,C2,C3,C4,PI1,PL2,PL5
Hotel	66.6	H1,H2,H3,H4,H5,H6
Poma	35.2	P1
Rice	434	R1,R2,R3,PI3,PI4
Total	1951	

Pioneer Environmental Associates LLC.
Project: Sugarbush Lincoln Peak Development
Date: 3/6/2003

Vermont Stormwater Treatment Standards Summary														
Location Descriptions														
Criteria	Subwatershed: PL1 Description: Parking Lots A,B,C		Subwatershed: PL2 Description: Parking Lots D,E,F		Subwatershed: PL3 Description: Parking Lot G		Subwatershed: PL4 Description: Access Road		Subwatershed: PL5 Description: Parking Lots H,I		Subwatershed: H2 Description: Hotel and Parking		Subwatershed: H3 Description: Center Plaza and Roof	
	Required	Design	Required	Design	Required	Design	Required	Design	Required	Design	Required	Design	Required	Design
WQv (gal)	118251	117516	84858	86534	60409	60455	19819	20568	51306	51016	82756	87664	**	
CPv (gals)	4533		18722		14520		0		23615		46613		**	
WQv+CPv (gals)	122784	131290	103580	105980	74929	77680	19819	20570	74921	80865	129369	148032	**	
Overbank (Q10) (cfs)	*													
Extreme storm (Q100) (cfs)	*													

* See Peak Discharge Summary Table on page 93 of Appendix 1

** See Stormwater Treatment Sizing Sheet on pages 15 and 16 of Appendix 1

Vermont Stormwater Treatment Standards Summary			
Recharge Area Requirement			
Brook	REa (acres)		Contributors
	Required	Design	
Clay	4.14	13.56	PL1, PL2,PL5
Rice	2.69	3.39	PL3,PL4,H2

Stormwater Treatment Sizing per VT Manual
Sugarbush/Lincoln Peak Base Area
Pioneer Environmental Associates LLC.
Date: 3/6/03

Subwatershed PL1
Description: Parking Lots A,B,C and Upslope Drainage Area

1) Water Quality Volume Calculation (WQv) - Section 1.1.1

Subwatershed	Area (acres) Impervious	Total	% Impervious:	Rv *	WQv acre-ft	gal
PL1	4.62	13.6	33.9%	0.36	0.363	118,251
Overall	4.62	13.6	33.9%		0.363	**118,251**

* Rv = 0.05 + (I) * (0.009)
** WQv = [(0.9") * (Rv) * (A)] / 12

Subwatershed	A (sq.mi.)	TR20 Inputs CN	tc (hr.)		
PL1	0.0213	55.0	0.181		
Overall	0.0213	55.0			
Sed. Forebay (10%) =	0.036	acre-ft	11,825	gal.	
Perm. Pool (90%) =	0.327	acre-ft	106,426	gal.	

2) Channel Protection Volume (CPv) for 12 hrs. ED - Section 1.1.2

Harrington Volume Method (see page 1-12 of 2002 Manual):

Qi =	0.05	cfs	
Qd =	0.04	inches	
Vr =	0.05	acre-ft	
Ia =	1.64	Ia = (200/CN) - 2	
P =	2.20	inches	
Ia/P =	0.74		
qu =	59	qu = Q*i*/(A*Qd)	
A =	0.0213	sq.mi.	
Required Qo/Qi =	0.430	(2002 Manual figure 1.5)	
Qo =	0.022		
Vs/Vr =	0.31	(2002 Manual pg. 1-12)	
Required Vs =	0.01	acre-ft	
	4,533	gal.	
WQv + CP v =	122,784	gal	

Abbreviations for Calculations:

Qi = Known inflow for 1 year storm(from TR-20)
Qd = Known runoff depth (from TR-20 output)
Vr = runoff volume
Ia = TR55 Initial Abstraction (unitless)
P = 1 yr. storm rainfall depth (in)

qu = unit peak discharge (csm/in)
A = drainage area
Qi = Known TR20 pond inflow (cfs)
Qo/Qi = Ratio of Pond Peak Outflow/Inflow
Qi * (Qo/Qi)
Vs/Vr = 0.682 - 1.43(Qo/Qi) + 1.64(Qo/Qi)^2 - 0.804(Qo/Qi)^3
where:
Vs = required storage volume (acre-ft)
Vr = design storm runoff volume (acre-ft)

3) Recharge Area (REa) - Section 1.1.3

Percent Volume Method

Rev = (F)(A)(I)/12
Where: Rev = Recharge volume (acre-feet)
F = Recharge factor (inches)
Hydrologic Soil Group Recharge Factor (F)

A	0.4
B	0.25
C	0.1
D	0

A = Site area (in acres)
I = Site imperviousness (expressed as a percent)

Soil Type: A
F = 0.4
A = 13.62
I = 33.9%

Rev = 0.154 ac-ft
6708 cu.ft
50178 gal

Percent Area Method

Rea = (F)(A)(I)
Where: Rea = Recharge area requiring treatment (acres)
F = Recharge factor (dimensionless)
Hydrologic Soil Group Recharge Factor (F)

A	0.4
B	0.25
C	0.1
D	0

A = Site area in acres
I = Site imperviousness (expressed as a percent)

Soil Type: A
F = 0.4
A = 13.62
I = 33.9%

Rea = **1.848** ac
80,499 sq.ft.

Stormwater Treatment Sizing per VT Manual
Sugarbush/Lincoln Peak Base Area
Pioneer Environmental Associates LLC.
Date: 3/6/03

Subwatershed PL2
Description: Parking Lots D,E, and F

1) Water Quality Volume Calculation (WQv) - Section 1.1.1

Subwatershed	Area (acres) Impervious	Total	% Impervious:	Rv *	WQv acre-ft	gal
PL2	3.56	5.37	66.3%	0.65	0.260	84,858
Overall	3.56	5.37	66.3%		0.260	**84,858**

* Rv = 0.05 + (I) * (0.009)
** WQv = [(0.9") * (Rv) * (A)] / 12

Subwatershed	A (sq.mi.)	TR20 Inputs CN	tc (hr.)	
PL2	0.00839	66.0	0.145	
Overall	0.00839	66.0		
Sed. Forebay (10%) =	0.026	acre-ft	8,486	gal.
Perm. Pool (90%) =	0.234	acre-ft	76,372	gal.

2) Channel Protection Volume (CPv) for 12 hrs. ED - Section 1.1.2

Harrington Volume Method (see page 1-12 of 2002 Manual):

Qi =	0.86	cfs	
Qd =	0.22	inches	
Vr =	0.10	acre-ft	
Ia =	1.03	Ia = (200/CN) - 2	
P =	2.20	inches	
Ia/P =	0.47		
qu =	466	qu = Qi/(A*Qd)	
A =	0.0084	sq.mi.	
Required Qo/Qi =	0.075	(2002 Manual figure 1.5)	
Qo =	0.065		
Vs/Vr =	0.58	(2002 Manual pg. 1-12)	
Required Vs =	0.06	acre-ft	
	18,722	gal.	
WQv + CP v =	103,580	gal	

Abbreviations for Calculations:

Qi = Known inflow for 1 year storm(from TR-20)
Qd = Known runoff depth (from TR-20 output)
Vr = runoff volume
Ia = TR55 Initial Abstraction (unitless)
P = 1 yr. storm rainfall depth (in)

qu = unit peak discharge (csm/in)
A = drainage area
Qi = Known TR20 pond inflow (cfs)
Qo/Qi = Ratio of Pond Peak Outflow/Inflow
Qi * (Qo/Qi)
Vs/Vr = 0.682 - 1.43(Qo/Qi) + 1.64(Qo/Qi)^2 - 0.804(Qo/Qi)^3
where:
Vs = required storage volume (acre-ft)
Vr = design storm runoff volume (acre-ft)

3) Recharge Area (REa) - Section 1.1.3

Percent Volume Method

Rev = (F)(A)(I)/12
Where: Rev = Recharge volume (acre-feet)
F = Recharge factor (inches)
Hydrologic Soil Group Recharge Factor (F)

A	0.4
B	0.25
C	0.1
D	0

A = Site area (in acres)
I = Site imperviousness (expressed as a percent)

Soil Type: A
F = 0.4
A = 5.37
I = 66.3%

Rev = 0.118667 ac-ft
5169 cu.ft
38665 gal

Percent Area Method

Rea = (F)(A)(I)
Where: Rea = Recharge area requiring treatment (acres)
F = Recharge factor (dimensionless)
Hydrologic Soil Group Recharge Factor (F)

A	0.4
B	0.25
C	0.1
D	0

A = Site area in acres
I = Site imperviousness (expressed as a percent)

Soil Type: A
F = 0.4
A = 5.37
I = 66.3%

Rea = **1.42** ac
62,029 sq.ft.

Stormwater Treatment Sizing per VT Manual
Sugarbush/Lincoln Peak Base Area
Pioneer Environmental Associates LLC.
Date: 3/6/03

Subwatershed **PL3**
Description: **Parking Lot G**

1) Water Quality Volume Calculation (WQv) - Section 1.1.1

Subwatershed	Area (acres) Impervious	Total	% Impervious:	Rv *	WQv acre-ft	gal
PL3	2.52	4.08	61.8%	0.61	0.185	60,409
Overall	2.52	4.08	61.8%		0.185	**60,409**

* Rv = 0.05 + (I) * (0.009)
** WQv = [(0.9") * (Rv) * (A)] / 12

Subwatershed	A (sq.mi.)	TR20 Inputs CN	tc (hr.)
PL3	0.00638	64.6	0.112
Overall	0.00638	64.6	

Sed. Forebay (10%) =	0.019	acre-ft	6,041	gal.
Perm. Pool (90%) =	0.167	acre-ft	54,368	gal.

2) Channel Protection Volume (CPv) for 12 hrs. ED - Section 1.1.2

Harrington Volume Method (see page 1-12 of 2002 Manual):

Qi =	0.83	cfs	Abbreviations for Calculations:
Qd =	0.22	inches	Qi = Known inflow for 1 year storm(from TR-20)
Vr =	0.07	acre-ft	Qd = Known runoff depth (from TR-20 output)
Ia =	1.10	Ia = (200/CN) - 2	Vr = runoff volume
P =	2.20	inches	Ia = TR55 Initial Abstraction (unitless)
Ia/P =	0.50		P = 1 yr. storm rainfall depth (in)
qu =	592	qu = Qi/(A*Qd)	qu = unit peak discharge (csm/in)
A =	0.0064	sq.mi.	A = drainage area
			Qi = Known TR20 pond inflow (cfs)
Required Qo/Qi =	0.065	(2002 Manual figure 1.5)	Qo/Qi = Ratio of Pond Peak Outflow/Inflow
Qo =	0.054		Qi * (Qo/Qi)
Vs/Vr =	0.60	(2002 Manual pg. 1-12)	Vs/Vr = 0.682 - 1.43(Qo/Qi) + 1.64(Qo/Qi)^2 - 0.804(Qo/Qi)^3
			where:
			Vs = required storage volume (acre-ft)
			Vr = design storm runoff volume (acre-ft)
Required Vs =	0.04	acre-ft	
	14,520	gal.	
WQv + CP v =	74,928	gal	

3) Recharge Area (REa) - Section 1.1.3

Percent Volume Method

Rev = (F)(A)(I)/12
Where: Rev = Recharge volume (acre-feet)
F = Recharge factor (inches)
Hydrologic Soil Group Recharge Factor (F)

A	0.4
B	0.25
C	0.1
D	0

A = Site area (in acres)
I = Site imperviousness (expressed as a percent)

Soil Type:	A	
F =	0.4	
A =	4.08	
I =	61.8%	
Rev =	0.084	ac-ft
	3659	cu.ft
	27370	gal

Percent Area Method

Rea = (F)(A)(I)
Where: Rea = Recharge area requiring treatment (acres)
F = Recharge factor (dimensionless)
Hydrologic Soil Group Recharge Factor (F)

A	0.4
B	0.25
C	0.1
D	0

A = Site area in acres
I = Site imperviousness (expressed as a percent)

Soil Type:	A	
F =	0.4	
A =	4.08	
I =	61.8%	
Rea =	**1.008**	ac
	43,908	sq.ft.

Stormwater Treatment Sizing per VT Manual
Sugarbush/Lincoln Peak Base Area
Pioneer Environmental Associates LLC.
Date: 3/6/03

Subwatershed PL4
Description: Access Road

1) Water Quality Volume Calculation (WQv) - Section 1.1.1

Subwatershed	Area (acres) Impervious	Total	% Impervious:	Rv *	WQv acre-ft	gal
PL4	0.74	2.9	25.5%	0.28	0.061	19,819
Overall	0.74	2.9	25.5%		0.061	**19,819**

* Rv = 0.05 + (I) * (0.009)
** WQv = [(0.9") * (Rv) * (A)] / 12

Subwatershed	A (sq.mi.)	TR20 Inputs CN	tc (hr.)
PL4	0.00453	48.1	0.144
Overall	0.00453	48.1	

Sed. Forebay (10%) =	0.006	acre-ft	1,982	gal.
Perm. Pool (90%) =	0.055	acre-ft	17,837	gal.

2) Channel Protection Volume (CPv) for 12 hrs. ED - Section 1.1.2

Harrington Volume Method (see page 1-12 of 2002 Manual):

Qi =	0	cfs	
Qd =	0	inches	
Vr =	0.00	acre-ft	
Ia =	2.16	Ia = (200/CN) - 2	
P =	2.20	inches	
Ia/P =	0.98		
qu =	0	qu = Qi/(A*Qd)	
A =	0.0045	sq.mi.	
Required Qo/Qi =	0.000	(2002 Manual figure 1.5)	
Qo =	0.000		
Vs/Vr =	0.68	(2002 Manual pg. 1-12)	
Required Vs =	0.00	acre-ft	
	0	gal.	
WQv + CP v =	19,819	gal	

Abbreviations for Calculations:

Qi = Known inflow for 1 year storm(from TR-20)
Qd = Known runoff depth (from TR-20 output)
Vr = runoff volume
Ia = TR55 Initial Abstraction (unitless)
P = 1 yr. storm rainfall depth (in)

qu = unit peak discharge (csm/in)
A = drainage area
Qi = Known TR20 pond inflow (cfs)
Qo/Qi = Ratio of Pond Peak Outflow/Inflow
Qi * (Qo/Qi)
Vs/Vr = 0.682 - 1.43(Qo/Qi) + 1.64(Qo/Qi)^2 - 0.804(Qo/Qi)^3
where:
Vs = required storage volume (acre-ft)
Vr = design storm runoff volume (acre-ft)

3) Recharge Area (REa) - Section 1.1.3

Percent Volume Method

Rev = (F)(A)(I)/12
Where: Rev = Recharge volume (acre-feet)
F = Recharge factor (inches)
Hydrologic Soil Group Recharge Factor (F)

A	0.4
B	0.25
C	0.1
D	0

A = Site area (in acres)
I = Site imperviousness (expressed as a percent)

Soil Type:	A
F =	0.4
A =	2.9
I =	25.5%
Rev =	0.024667 ac-ft
	1074 cu.ft
	8037 gal

Percent Area Method

Rea = (F)(A)(I)
Where: Rea = Recharge area requiring treatment (acres)
F = Recharge factor (dimensionless)
Hydrologic Soil Group Recharge Factor (F)

A	0.4
B	0.25
C	0.1
D	0

A = Site area in acres
I = Site imperviousness (expressed as a percent)

Soil Type:	A
F =	0.4
A =	2.9
I =	25.5%
Rea =	**0.296** ac
	12,894 sq.ft.

Stormwater Treatment Sizing per VT Manual
Sugarbush/Lincoln Peak Base Area
Pioneer Environmental Associates LLC.
Date: 3/6/03

Subwatershed PL5
Description: Parking Lot H and I

1) Water Quality Volume Calculation (WQv) - Section 1.1.1

Subwatershed	Area (acres) Impervious	Total	% Impervious:	Rv *	WQv acre-ft	gal
PL5	2.17	3.02	71.7%	0.70	0.157	51,306
Overall	2.17	3.02	71.7%		0.157	**51,306**

* Rv = 0.05 + (I) * (0.009)
** WQv = [(0.9") * (Rv) * (A)] / 12

Subwatershed	A (sq.mi.)	TR20 Inputs CN	tc (hr.)	
PL5	0.00472	74.4	0.115	
Overall	0.00472	74.4		
Sed. Forebay (10%) =	0.016	acre-ft	5,131	gal.
Perm. Pool (90%) =	0.142	acre-ft	46,175	gal.

2) Channel Protection Volume (CPv) for 12 hrs. ED - Section 1.1.2

Harrington Volume Method (see page 1-12 of 2002 Manual):

Qi =	1.87	cfs	Qi = Known inflow for 1 year storm(from TR-20)
Qd =	0.46	inches	Qd = Known runoff depth (from TR-20 output)
Vr =	0.12	acre-ft	Vr = runoff volume
Ia =	0.69	Ia = (200/CN) - 2	Ia = TR55 Initial Abstraction (unitless)
P =	2.20	inches	P = 1 yr. storm rainfall depth (in)
Ia/P =	0.31		
qu =	862	qu = Qi/(A*Qd)	qu = unit peak discharge (csm/in)
A =	0.0047	sq.mi.	A = drainage area
			Qi = Known TR20 pond inflow (cfs)
Required Qo/Qi =	0.041	(2002 Manual figure 1.5)	Qo/Qi = Ratio of Pond Peak Outflow/Inflow
Qo =	0.077		Qi * (Qo/Qi)
Vs/Vr =	0.63	(2002 Manual pg. 1-12)	Vs/Vr = 0.682 - 1.43(Qo/Qi) + 1.64(Qo/Qi)^2 - 0.804(Qo/Qi)^3
			where:
			Vs = required storage volume (acre-ft)
			Vr = design storm runoff volume (acre-ft)
Required Vs =	0.07	acre-ft	
	23,615	gal.	
WQv + CP v =	74,921	gal	

3) Recharge Area (REa) - Section 1.1.3

Percent Volume Method

Rev = (F)(A)(I)/12
Where: Rev = Recharge volume (acre-feet)
F = Recharge factor (inches)
Hydrologic Soil Group Recharge Factor (F)

A	0.4
B	0.25
C	0.1
D	0

A = Site area (in acres)
I = Site imperviousness (expressed as a percent)

Soil Type:	A
F =	0.4
A =	3.02
I =	71.7%
Rev =	0.072167 ac-ft
	3144 cu.ft
	23514 gal

Percent Area Method

Rea = (F)(A)(I)
Where: Rea = Recharge area requiring treatment (acres)
F = Recharge factor (dimensionless)
Hydrologic Soil Group Recharge Factor (F)

A	0.4
B	0.25
C	0.1
D	0

A = Site area in acres
I = Site imperviousness (expressed as a percent)

Soil Type:	A
F =	0.4
A =	3.02
I =	71.7%
Rea =	**0.866** ac
	37,723 sq.ft.

Stormwater Treatment Sizing per VT Manual
Sugarbush/Lincoln Peak Base Area
Pioneer Environmental Associates LLC.
Date: 3/6/03

Subwatershed H2
Description: Hotel Area and Parking Lot

1) Water Quality Volume Calculation (WQv) - Section 1.1.1

Subwatershed	Area (acres) Impervious	Total	% Impervious:	Rv *	WQv acre-ft	gal
H2	3.46	5.45	63.5%	0.62	0.254	82,756
Overall	3.46	5.45	63.5%		0.254	**82,756**

* Rv = 0.05 + (I) * (0.009)
** WQv = [(0.9") * (Rv) * (A)] / 12

Subwatershed	A (sq.mi.)	TR20 Inputs CN	tc (hr.)
H2	0.00852	75.5	0.104
Overall	0.00852	75.5	

Sed. Forebay (10%) =	0.025	acre-ft	8,276	gal.
Perm. Pool (90%) =	0.229	acre-ft	74,481	gal.

2) Channel Protection Volume (CPv) for 12 hrs. ED - Section 1.1.2

Harrington Volume Method (see page 1-12 of 2002 Manual):

Qi =	3.86	cfs	Qi = Known inflow for 1 year storm(from TR-20)
Qd =	0.5	inches	Qd = Known runoff depth (from TR-20 output)
Vr =	0.23	acre-ft	Vr = runoff volume
Ia =	0.65	Ia = (200/CN) - 2	Ia = TR55 Initial Abstraction (unitless)
P =	2.20	inches	P = 1 yr. storm rainfall depth (in)
Ia/P =	0.30		
qu =	907	qu = Qi/(A*Qd)	qu = unit peak discharge (csm/in)
A =	0.0085	sq.mi.	A = drainage area
			Qi = Known TR20 pond inflow (cfs)
Required Qo/Qi =	0.038	(2002 Manual figure 1.5)	Qo/Qi = Ratio of Pond Peak Outflow/Inflow
Qo =	0.147		Qi * (Qo/Qi)
Vs/Vr =	0.63	(2002 Manual pg. 1-12)	Vs/Vr = 0.682 - 1.43(Qo/Qi) + 1.64(Qo/Qi)^2 - 0.804(Qo/Qi)^3
			where:
			Vs = required storage volume (acre-ft)
			Vr = design storm runoff volume (acre-ft)
Required Vs =	0.14	acre-ft	
	46,613	gal.	
WQv + CP v =	129,369	gal	

3) Recharge Area (REa) - Section 1.1.3

Percent Volume Method

Rev = (F)(A)(I)/12
Where: Rev = Recharge volume (acre-feet)
F = Recharge factor (inches)
Hydrologic Soil Group Recharge Factor (F)

A	0.4
B	0.25
C	0.1
D	0

A = Site area (in acres)
I = Site imperviousness (expressed as a percent)

Soil Type: A
F = 0.4
A = 5.45
I = 63.5%

Rev = 0.115333 ac-ft
5024 cu.ft
37579 gal

Percent Area Method

Rea = (F)(A)(I)
Where: Rea = Recharge area requiring treatment (acres)
F = Recharge factor (dimensionless)
Hydrologic Soil Group Recharge Factor (F)

A	0.4
B	0.25
C	0.1
D	0

A = Site area in acres
I = Site imperviousness (expressed as a percent)

Soil Type: A
F = 0.4
A = 5.45
I = 63.5%

Rea = **1.384** ac
60,287 sq.ft.

Stormwater Treatment Sizing per VT Manual
Sugarbush/Lincoln Peak Base Area
Pioneer Environmental Associates LLC.
Date: 3/6/03

Subwatershed H3
Description: Center Plaza and Roof

1) Water Quality Volume Calculation (WQv) - Section 1.1.1

Subwatershed	Area (acres) Impervious	Total	% Impervious:	Rv *	WQv acre-ft	gal
H3	0.716	0.724	98.9%	0.94	0.051	16,632
Overall	0.716	0.724	98.9%		0.051	**16,632**

* Rv = 0.05 + (I) * (0.009)
** WQv = [(0.9") * (Rv) * (A)] / 12

Subwatershed	A (sq.mi.)	TR20 Inputs CN	tc (hr.)
H3	0.00113	97.3	0.0833
Overall	0.001131	97.3	

Sed. Forebay (10%) =	0.005	acre-ft	1,663	gal.
Perm. Pool (90%) =	0.046	acre-ft	14,969	gal.

Infiltration sizing

Ab = (2Vw – Atdb)/(db – P/6 + fcT/6)

Where:

Ab = surface area at the bottom of the basin (ft2)	TBD		
Vw = design volume (e.g., WQv) (ft3)	2224	ft3	16632 gal
At = estimated area at the top of the basin (ft2)	1600	sq.ft.	
db = depth of the basin (ft)	2.5	ft	
P = design rainfall depth (inches)	0.9	inches	
fc = infiltration rate (in/hr)	0.5	in/hr	
T = time to fill trench or dry well (hours) (generally assumed to be less than 2 hours)	2	hours	

Ab = 178 sq.ft.

Stormwater Treatment Sizing per VT Manual
Sugarbush/Lincoln Peak Base Area
Pioneer Environmental Associates LLC.
Date: 3/6/03

Subwatershed H3
Description: Center Plaza and Roof

2) Channel Protection Volume (CPv) for 12 hrs. ED - Section 1.1.2

Harrington Volume Method (see page 1-12 of 2002 Manual):

Qi =	1.84	cfs
Qd =	1.87	inches
Vr =	0.11	acre-ft
Ia =	0.06	Ia = (200/CN) - 2
P =	2.20	inches
Ia/P =	0.03	
qu =	870	qu = Qi/(A*Qd)
A =	0.0011	sq.mi.
Required Qo/Qi =	0.041	(2002 Manual figure 1.5)
Qo =	0.075	
Vs/Vr =	0.63	(2002 Manual pg. 1-12)

Abbreviations for Calculations:

Qi = Known inflow for 1 year storm(from TR-20)
Qd = Known runoff depth (from TR-20 output)
Vr = runoff volume
Ia = TR55 Initial Abstraction (unitless)
P = 1 yr. storm rainfall depth (in)

qu = unit peak discharge (csm/in)
A = drainage area
Qi = Known TR20 pond inflow (cfs)
Qo/Qi = Ratio of Pond Peak Outflow/Inflow
Qi * (Qo/Qi)
Vs/Vr = 0.682 - 1.43(Qo/Qi) + 1.64(Qo/Qi)^2 - 0.804(Qo/Qi)^3
where:
Vs = required storage volume (acre-ft)
Vr = design storm runoff volume (acre-ft)

Required Vs =	0.07	acre-ft
	23,015	gal.
WQv + CP v =	39,647	gal

3) Recharge Area (REa) - Section 1.1.3

Percent Volume Method

Rev = (F)(A)(I)/12
Where: Rev = Recharge volume (acre-feet)
F = Recharge factor (inches)
Hydrologic Soil Group Recharge Factor (F)

A	0.4
B	0.25
C	0.1
D	0

A = Site area (in acres)
I = Site imperviousness (expressed as a percent)

Soil Type:	A
F =	0.4
A =	0.724
I =	98.9%
Rev =	0.023867 ac-ft
	1040 cu.ft
	7776 gal

Percent Area Method

Rea = (F)(A)(I)
Where: Rea = Recharge area requiring treatment (acres)
F = Recharge factor (dimensionless)
Hydrologic Soil Group Recharge Factor (F)

A	0.4
B	0.25
C	0.1
D	0

A = Site area in acres
I = Site imperviousness (expressed as a percent)

Soil Type:	A
F =	0.4
A =	0.724
I =	98.9%
Rea =	**0.286** ac
	12,476 sq.ft.

Sugarbush/Lincoln Peak Base Area 3/4/03
Post-Development Conditions : Detention Pond Sizing
Basis for Design
Pioneer Environmental Associates, LLC

Pond Number: 1
Subwatershed: PL1
Description: Parking Lots A, B, C

1. ELEVATION DATA

Bottom Elevation (ft):	1554.00
1st Row of Riser Perforations (ft):	1559.50
2nd Row of Riser Perforations (ft):	1560.00
Riser Outlet Elevation (ft):	1560.50
Riser Barrel Outlet Elevation (ft):	1556.00
Riser Barrel Length (ft):	60.00
Spillway Elevation (ft):	1561.00
Top of Berm Elev. (ft):	1563.00
Normal Water Level Elev. (ft):	1559.50
Normal Wet or Dry:	Wet

2. OUTLET DATA

Riser Diameter (in):	12
Riser Barrel Diameter (in):	12
Number of Risers:	1
1st Row Number of Riser Perforations:	1
1st Row Diameter of Riser Perforations (in):	1
2nd Row Number of Riser Perforations:	3
2nd Row Diameter of Riser Perforations (in):	2
Base of Spillway Width (ft.):	4 Side Slopes 1: 3

Elevation (ft)	Height Above Riser (ft)	Q (cfs) Perfs.	Q (cfs) Riser	Q (cfs) Spillway	**Q Total (cfs)**
1554.0	0.0	0.00	0.00	0.00	**0.00**
1555.0	0.0	0.00	0.00	0.00	**0.00**
1556.0	0.0	0.00	0.00	0.00	**0.00**
1557.0	0.0	0.00	0.00	0.00	**0.00**
1558.0	0.0	0.00	0.00	0.00	**0.00**
1559.0	0.0	0.00	0.00	0.00	**0.00**
1559.5	0.0	0.00	0.00	0.00	**0.00**
1560.0	0.0	0.02	0.00	0.00	**0.02**
1560.5	0.0	0.29	0.00	0.00	**0.29**
1561.0	0.5	0.41	2.67	0.00	**3.08**
1561.5	1.0	0.49	3.78	6.42	**10.69**
1562.0	1.5	0.57	4.63	23.10	**28.30**
1562.5	2.0	0.63	5.13	51.53	**57.30**
1563.0	2.5	0.69	5.34	93.34	**99.38**

3. VOLUME DATA

Elevation (ft)	Depth (ft)	Total AREA (sq. ft)	Total AREA (acres)	INCREM. vol.(ft^3)	CUMUL. VOLUME (acre-ft)	(gal)
1554.0	0.0	875	0.020	0	0.000	0
1555.0	1.0	1415	0.032	1134	0.026	8484
1556.0	2.0	1950	0.045	1675	0.064	21016
1557.0	3.0	2875	0.066	2398	0.120	38950
1558.0	4.0	3800	0.087	3327	0.196	63834
1559.0	5.0	5100	0.117	4434	0.298	97001
1559.5	5.5	5880	0.135	2743	0.361	117516
1560.0	6.0	6400	0.147	3069	0.431	140473
1560.5	6.5	7065	0.162	3365	0.508	165642
1561.0	7.0	7730	0.177	3698	0.593	193300
1561.5	7.5	8400	0.193	4031	0.686	223454
1562.0	8.0	9060	0.208	4364	0.786	256096
1562.5	8.5	10600	0.243	4910	0.899	292823
1563.0	9.0	12140	0.279	5681	1.029	335314

Sugarbush/Lincoln Peak Base Area 3/4/03
Post-Development Conditions : Detention Pond Sizing
Basis for Design
Pioneer Environmental Associates, LLC

Pond Number: 2
Subwatershed: PL2
Description: Parking Lots D, E, F

1. ELEVATION DATA

Bottom Elevation (ft):	1522.00
1st Row of Riser Perforations (ft):	1529.50
2nd Row of Riser Perforations (ft):	1530.00
Riser Outlet Elevation (ft):	1531.00
Riser Barrel Outlet Elevation (ft):	1522.00
Riser Barrel Length (ft):	60.00
Spillway Elevation (ft):	1532.00
Top of Berm Elev. (ft):	1534.00
Normal Water Level Elev. (ft):	1529.50
Normal Wet or Dry:	Wet

2. OUTLET DATA

Riser Diameter (in):	12
Riser Barrel Diameter (in):	12
Number of Risers:	1
1st Row Number of Riser Perforations:	1
1st Row Diameter of Riser Perforations (in):	1
2nd Row Number of Riser Perforations:	3
2nd Row Diameter of Riser Perforations (in):	2
Base of Spillway Width (ft.):	6

Side Slopes 1: 3

Elevation (ft)	Height Above Riser (ft)	Q (cfs) Perfs.	Q (cfs) Riser	Q (cfs) Spillway	Q Total (cfs)
1522.0	0.0	0.00	0.00	0.00	**0.00**
1523.0	0.0	0.00	0.00	0.00	**0.00**
1524.0	0.0	0.00	0.00	0.00	**0.00**
1525.0	0.0	0.00	0.00	0.00	**0.00**
1526.0	0.0	0.00	0.00	0.00	**0.00**
1527.0	0.0	0.00	0.00	0.00	**0.00**
1528.0	0.0	0.00	0.00	0.00	**0.00**
1529.0	0.0	0.00	0.00	0.00	**0.00**
1529.5	0.0	0.00	0.00	0.00	**0.00**
1530.0	0.0	0.02	0.00	0.00	**0.02**
1530.5	0.0	0.29	0.00	0.00	**0.29**
1531.0	0.0	0.41	0.00	0.00	**0.41**
1531.5	0.5	0.49	2.67	0.00	**3.17**
1532.0	1.0	0.57	3.78	0.00	**4.35**
1532.5	1.5	0.63	4.63	8.75	**14.02**
1533.0	2.0	0.69	5.35	29.70	**35.74**
1533.5	2.5	0.75	5.98	63.66	**70.38**
1534.0	3.0	0.80	6.55	112.01	**119.36**

3. VOLUME DATA

Elevation (ft)	Depth (ft)	Forebay AREA (sq. ft)	Main AREA (sq. ft)	Total AREA (sq. ft)	AREA (acres)	INCREM. vol.(ft^3)	CUMUL. VOLUME (acre-ft)	(gal)
1522.0	0.0	0	180	180	0.004	0	0.000	0
1523.0	1.0	0	360	360	0.008	265	0.006	1981
1524.0	2.0	45	540	585	0.013	468	0.017	5482
1525.0	3.0	180	720	900	0.021	737	0.034	10993
1526.0	4.0	450	990	1440	0.033	1159	0.060	19666
1527.0	5.0	720	1260	1980	0.045	1703	0.099	32403
1528.0	6.0	1170	1530	2700	0.062	2331	0.153	49837
1529.0	7.0	0	3420	3420	0.079	3053	0.223	72673
1529.5	7.5	0	4000	4000	0.092	1853	0.266	86534
1530.0	8.0	0	4500	4500	0.103	2124	0.314	102420
1530.5	8.5	0	5040	5040	0.116	2384	0.369	120250
1531.0	9.0	0	5550	5550	0.127	2646	0.430	140046
1531.5	9.5	0	5900	5900	0.135	2862	0.496	161454
1532.0	10.0	0	6400	6400	0.147	3074	0.566	184449
1532.5	10.5	0	6800	6800	0.156	3299	0.642	209129
1533.0	11.0	0	7200	7200	0.165	3500	0.722	235305
1533.5	11.5	0	7600	7600	0.174	3700	0.807	262978
1534.0	12.0	0	8000	8000	0.184	3900	0.897	292147

Sugarbush/Lincoln Peak Base Area 3/4/03
Post-Development Conditions : Detention Pond Sizing
Basis for Design
Pioneer Environmental Associates, LLC

Pond Number: 3
Subwatershed: H2
Description: Hotel area and Parking Lot

1. ELEVATION DATA

Bottom Elevation (ft):	1524.00
1st Row of Riser Perforations (ft):	1529.50
2nd Row of Riser Perforations (ft):	1531.00
Riser Outlet Elevation (ft):	1532.50
Riser Barrel Outlet Elevation (ft):	1523.00
Riser Barrel Length (ft):	220.00
Spillway Elevation (ft):	1533.00
Top of Berm Elev. (ft):	1535.00
Normal Water Level Elev. (ft):	1529.50
Normal Wet or Dry:	Wet

2. OUTLET DATA

Riser Diameter (in):	12		
Riser Barrel Diameter (in):	12		
Number of Risers:	1		
1st Row Number of Riser Perforations:	1		
1st Row Diameter of Riser Perforations (in):	1		
2nd Row Number of Riser Perforations:	3		
2nd Row Diameter of Riser Perforations (in):	2		
Base of Spillway Width (ft.):	4	Side Slopes 1:	3

Elevation (ft)	Height Above Riser (ft)	Q (cfs) Perfs.	Q (cfs) Riser	Q (cfs) Spillway	**Q Total (cfs)**
1524.0	0.0	0.00	0.00	0.00	**0.00**
1525.0	0.0	0.00	0.00	0.00	**0.00**
1526.0	0.0	0.00	0.00	0.00	**0.00**
1527.0	0.0	0.00	0.00	0.00	**0.00**
1528.0	0.0	0.00	0.00	0.00	**0.00**
1529.0	0.0	0.00	0.00	0.00	**0.00**
1529.5	0.0	0.00	0.00	0.00	**0.00**
1530.0	0.0	0.02	0.00	0.00	**0.02**
1531.5	0.0	0.03	0.00	0.00	**0.03**
1531.0	0.0	0.04	0.00	0.00	**0.04**
1531.5	0.0	0.30	0.00	0.00	**0.30**
1532.0	0.0	0.42	0.00	0.00	**0.42**
1532.5	0.0	0.50	0.00	0.00	**0.50**
1533.0	0.5	0.58	2.67	0.00	**3.25**
1533.5	1.0	0.64	3.78	6.42	**10.84**
1534.0	1.5	0.70	3.99	23.10	**27.79**
1534.5	2.0	0.76	4.08	51.53	**56.37**
1535.0	2.5	0.81	4.18	93.34	**98.32**

3. VOLUME DATA

Elevation (ft)	Depth (ft)	Forebay AREA (sq. ft)	Main AREA (sq. ft)	Total AREA (sq. ft)	AREA (acres)	INCREM. vol.(ft^3)	CUMUL. VOLUME (acre-ft)	(gal)
1524.0	0.0	180	0	180	0.004	0	0.000	0
1525.0	1.0	360	0	360	0.008	265	0.006	1981
1526.0	2.0	810	630	1440	0.033	840	0.025	8264
1527.0	3.0	900	1170	2070	0.048	1745	0.065	21321
1528.0	4.0	1170	1710	2880	0.066	2464	0.122	39750
1529.0	5.0	1440	3870	5310	0.122	4034	0.215	69921
1529.5	5.5	0	4200	4200	0.096	2372	0.269	87664
1530.0	6.0	0	4590	4590	0.105	2197	0.319	104096
1530.5	6.5	0	5250	5250	0.121	2458	0.376	122483
1531.0	7.0	0	5940	5940	0.136	2796	0.440	143395
1531.5	7.5	0	6100	6100	0.140	3010	0.509	165910
1532.0	8.0	0	6300	6300	0.145	3100	0.580	189097
1532.5	8.5	0	6840	6840	0.157	3284	0.656	213661
1533.0	9.0	0	7500	7500	0.172	3584	0.738	240468
1533.5	9.5	0	8400	8400	0.193	3973	0.829	270185
1534.0	10.0	0	9400	9400	0.216	4448	0.931	303453
1534.5	10.5	0	10400	10400	0.239	4948	1.045	340464
1535.0	11.0	0	11400	10401	0.239	5200	1.164	379361

Sugarbush/Lincoln Peak Base Area 3/4/03
Post-Development Conditions : Detention Pond Sizing
Basis for Design
Pioneer Environmental Associates, LLC

Pond Number: 4
Subwatershed: PL3
Description: Parking Lot G

1. ELEVATION DATA

Bottom Elevation (ft):	1481.00
1st Row of Riser Perforations (ft):	1485.80
2nd Row of Riser Perforations (ft):	1487.00
Riser Outlet Elevation (ft):	1487.50
Riser Barrel Outlet Elevation (ft):	1477.00
Riser Barrel Length (ft):	80.00
Spillway Elevation (ft):	1489.00
Top of Berm Elev. (ft):	1491.00
Normal Water Level Elev. (ft):	1485.80
Normal Wet or Dry:	Wet

2. OUTLET DATA

Riser Diameter (in):	12
Riser Barrel Diameter (in):	12
Number of Risers:	1
1st Row Number of Riser Perforations:	1
1st Row Diameter of Riser Perforations (in):	1
2nd Row Number of Riser Perforations:	3
2nd Row Diameter of Riser Perforations (in):	2
Base of Spillway Width (ft.):	6

Side Slopes 1: 3

Elevation (ft)	Height Above Riser (ft)	Q (cfs) Perfs.	Q (cfs) Riser	Q (cfs) Spillway	**Q Total (cfs)**
1481.0	0.0	0.00	0.00	0.00	**0.00**
1482.0	0.0	0.00	0.00	0.00	**0.00**
1483.0	0.0	0.00	0.00	0.00	**0.00**
1484.0	0.0	0.00	0.00	0.00	**0.00**
1485.0	0.0	0.00	0.00	0.00	**0.00**
1485.8	0.0	0.00	0.00	0.00	**0.00**
1486.0	0.0	0.01	0.00	0.00	**0.01**
1486.5	0.0	0.03	0.00	0.00	**0.03**
1487.0	0.0	0.03	0.00	0.00	**0.03**
1487.5	0.0	0.30	0.00	0.00	**0.30**
1488.0	0.5	0.41	2.67	0.00	**3.09**
1488.5	1.0	0.50	3.78	0.00	**4.28**
1489.0	1.5	0.57	4.63	0.00	**5.21**
1489.5	2.0	0.64	5.35	8.75	**14.74**
1490.0	2.5	0.70	5.98	29.70	**36.38**
1490.5	3.0	0.75	6.55	63.66	**70.96**
1491.0	3.5	0.81	6.95	112.01	**119.76**

3. VOLUME DATA

Elevation (ft)	Depth (ft)	Forebay AREA (sq. ft)	Main AREA (sq. ft)	Total AREA (sq. ft)	AREA (acres)	INCREM. vol.(ft^3)	CUMUL. VOLUME (acre-ft)	(gal)
1481.0	0.0	0	90	90	0.002	0	0.000	0
1482.0	1.0	135	900	1035	0.024	477	0.011	3566
1483.0	2.0	270	1260	1530	0.035	1274	0.040	13099
1484.0	3.0	450	1530	1980	0.045	1750	0.080	26190
1485.0	4.0	540	1980	2520	0.058	2245	0.132	42980
1485.8	4.8	840	2500	3340	0.077	2336	0.186	60455
1486.0	5.0	900	2700	3600	0.083	694	0.201	65645
1486.5	5.5	0	2850	2850	0.065	1609	0.238	77679
1487.0	6.0	0	3060	3060	0.070	1477	0.272	88729
1487.5	6.5	0	4250	4250	0.098	1819	0.314	102338
1488.0	7.0	0	5580	5580	0.128	2450	0.370	120664
1488.5	7.5	0	5850	5850	0.134	2857	0.436	142036
1489.0	8.0	0	7240	7240	0.166	3266	0.511	166468
1489.5	8.5	0	8050	8050	0.185	3821	0.599	195047
1490.0	9.0	0	8900	8900	0.204	4236	0.696	226730
1490.5	9.5	0	9700	9700	0.223	4649	0.803	261501
1491.0	10.0	0	10560	10560	0.242	5063	0.919	299376

Sugarbush/Lincoln Peak Base Area
Post-Development Conditions : Detention Pond Sizing
Basis for Design
Pioneer Environmental Associates, LLC

3/4/03

Pond Number: 5
Subwatershed: PL4
Description: Access Road

1. ELEVATION DATA

Bottom Elevation (ft):	1454.50
1st Row of Riser Perforations (ft):	1458.60
Riser Outlet Elevation (ft):	1459.00
Riser Barrel Outlet Elevation (ft):	1452.00
Riser Barrel Length (ft):	40.00
Spillway Elevation (ft):	1459.50
Top of Berm Elev. (ft):	1461.50
Normal Water Level Elev. (ft):	1458.60
Normal Wet or Dry:	Wet

2. OUTLET DATA

Riser Diameter (in):	12
Riser Barrel Diameter (in):	12
Number of Risers:	1
Number of Riser Perforations:	1
Diameter of Riser Perforations (in):	1
Base of Spillway Width (ft.):	6

Side Slopes 1: 3

Elevation (ft)	Height Above Riser (ft)	Q (cfs) Perfs.	Q (cfs) Riser	Q (cfs) Spillway	**Q Total (cfs)**
1454.50	0.0	0.00	0.00	0.00	**0.00**
1455.0	0.0	0.00	0.00	0.00	**0.00**
1456.0	0.0	0.00	0.00	0.00	**0.00**
1457.0	0.0	0.00	0.00	0.00	**0.00**
1458.0	0.0	0.00	0.00	0.00	**0.00**
1458.6	0.0	0.00	0.00	0.00	**0.00**
1459.0	0.0	0.02	0.00	0.00	**0.02**
1459.5	0.5	0.03	2.67	0.00	**2.70**
1460.0	1.0	0.04	3.78	8.75	**12.57**
1460.5	1.5	0.04	4.63	29.70	**34.37**
1461.0	2.0	0.05	5.35	63.66	**69.05**
1461.5	2.5	0.05	5.98	112.01	**118.03**

3. VOLUME DATA

Elevation (ft)	Depth (ft)	Forebay AREA (sq. ft)	Main AREA (sq. ft)	Total AREA (sq. ft)	AREA (acres)	INCREM. vol.(ft^3)	CUMUL. VOLUME (acre-ft)	(gal)
1454.50	0.0	0	0	0	0.000	0	0.000	0
1455.0	0.5	0	90	90	0.002	15	0.0003	112
1456.0	1.5	90	360	450	0.010	247	0.006	1960
1457.0	2.5	180	450	630	0.014	537	0.018	5981
1458.0	3.5	270	1260	1530	0.035	1047	0.042	13814
1458.6	4.1	0	1480	1480	0.034	903	0.063	20568
1459.0	4.5	0	1710	1710	0.039	637	0.078	25336
1459.5	5.0	0	2100	2100	0.048	951	0.100	32449
1460.0	5.5	0	2480	2480	0.057	1144	0.126	41003
1460.5	6.0	0	2870	2870	0.066	1336	0.157	50999
1461.0	6.5	0	3220	3220	0.074	1522	0.191	62381
1461.5	7.0	0	3570	3570	0.082	1697	0.230	75073

Sugarbush/Lincoln Peak Base Area
Post-Development Conditions : Detention Pond Sizing
Basis for Design
Pioneer Environmental Associates, LLC

3/5/03

Pond Number: 6
Subwatershed: H3
Description: Center Plaza and Roof

1. ELEVATION DATA

Bottom Elevation (ft):	1543.00
1st Row of Riser Perforations (ft):	1543.00
Riser Outlet Elevation (ft):	1545.50
Riser Barrel Outlet Elevation (ft):	1541.50
Riser Barrel Length (ft):	40.00
Spillway Elevation (ft):	1546.50
Top of Berm Elev. (ft):	1548.50
Normal Water Level Elev. (ft):	1543.00
Normal Wet or Dry:	Dry

2. OUTLET DATA

Riser Diameter (in):	12
Riser Barrel Diameter (in):	12
Number of Risers:	1
Number of Riser Perforations:	2
Diameter of Riser Perforations (in):	1
Base of Spillway Width (ft.):	6

Side Slopes 1: 3

Elevation (ft)	Height Above Riser (ft)	Q (cfs) Perfs.	Q (cfs) Riser	Q (cfs) Spillway	**Q Total (cfs)**
1543.0	0.0	0.00	0.00	0.00	**0.00**
1543.5	0.0	0.04	0.00	0.00	**0.04**
1544.0	0.0	0.06	0.00	0.00	**0.06**
1544.5	0.0	0.08	0.00	0.00	**0.08**
1545.0	0.0	0.09	0.00	0.00	**0.09**
1545.5	0.0	0.10	0.00	0.00	**0.10**
1546.0	0.5	0.11	2.67	0.00	**2.78**
1546.5	1.0	0.11	3.78	0.00	**3.90**
1547.0	1.5	0.12	4.63	8.75	**13.50**
1547.5	2.0	0.13	5.35	29.70	**35.18**
1548.0	2.5	0.14	5.89	63.66	**69.68**
1548.5	3.0	0.14	6.13	112.01	**118.28**

3. VOLUME DATA

Elevation (ft)	Depth (ft)	Total AREA (sq. ft)	AREA (acres)	INCREM. vol.(ft^3)	CUMUL. VOLUME (acre-ft)	(gal)
1543.0	0.0	300	0.007	0	0.000	0
1543.5	0.5	400	0.009	174	0.004	1305
1544.0	1.0	500	0.011	225	0.009	2984
1544.5	1.5	650	0.015	287	0.016	5128
1545.0	2.0	800	0.018	362	0.024	7835
1545.5	2.5	950	0.022	437	0.034	11104
1546.0	3.0	1120	0.026	517	0.046	14970
1546.5	3.5	1270	0.029	597	0.060	19436
1547.0	4.0	1420	0.033	672	0.075	24464
1547.5	4.5	1570	0.036	747	0.092	30053
1548.0	5.0	1860	0.043	856	0.112	36460
1548.5	5.5	2050	0.047	977	0.134	43768

Sugarbush/Lincoln Peak Base Area
Post-Development Conditions : Detention Pond Sizing
Basis for Design
Pioneer Environmental Associates, LLC

3/4/03

Pond Number: 7
Subwatershed: PL5
Description: Parking Lots H and I

1. ELEVATION DATA

Bottom Elevation (ft):	1542.00
1st Row of Riser Perforations (ft):	1545.00
Riser Outlet Elevation (ft):	1546.00
Riser Barrel Outlet Elevation (ft):	1538.00
Riser Barrel Length (ft):	70.00
Spillway Elevation (ft):	1546.50
Top of Berm Elev. (ft):	1547.50
Normal Water Level Elev. (ft):	1545.00
Normal Wet or Dry:	Wet

2. OUTLET DATA

Riser Diameter (in):	12
Riser Barrel Diameter (in):	12
Number of Risers:	1
1st Row Number of Riser Perforations:	1
1st Row Diameter of Riser Perforations (in):	1
Base of Spillway Width (ft.):	4

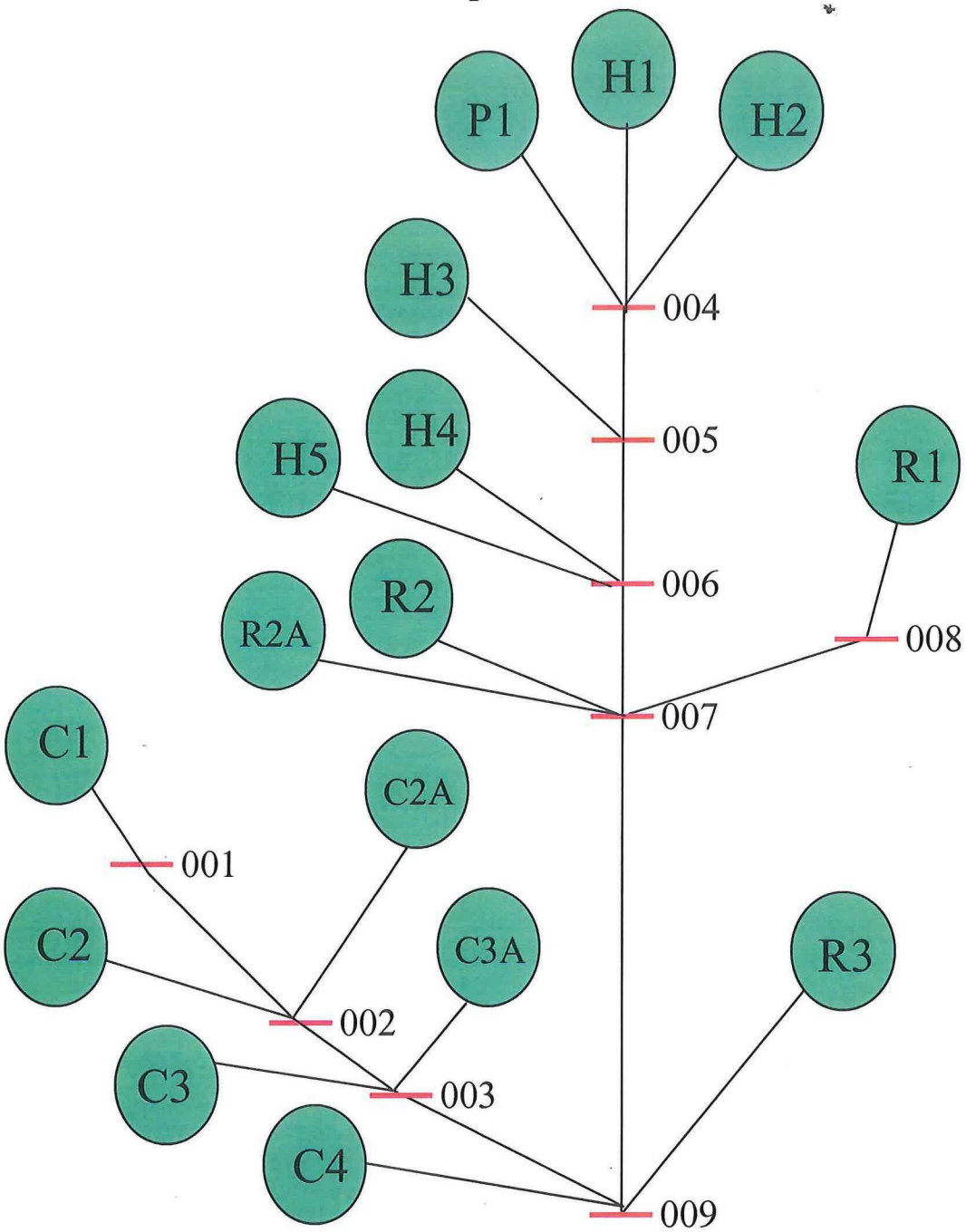
Side Slopes 1: 3

Elevation (ft)	Height Above Riser (ft)	Q (cfs) Perfs.	Q (cfs) Riser	Q (cfs) Spillway	**Q Total (cfs)**
1542.0	0.0	0.00	0.00	0.00	**0.00**
1542.5	0.0	0.00	0.00	0.00	**0.00**
1543.0	0.0	0.00	0.00	0.00	**0.00**
1543.5	0.0	0.00	0.00	0.00	**0.00**
1544.0	0.0	0.00	0.00	0.00	**0.00**
1544.5	0.0	0.00	0.00	0.00	**0.00**
1545.0	0.0	0.00	0.00	0.00	**0.00**
1545.5	0.0	0.02	0.00	0.00	**0.02**
1546.0	0.0	0.03	0.00	0.00	**0.03**
1546.5	0.5	0.04	2.67	0.00	**2.71**
1547.0	1.0	0.04	3.78	6.42	**10.24**
1547.5	1.5	0.05	4.63	23.10	**27.78**

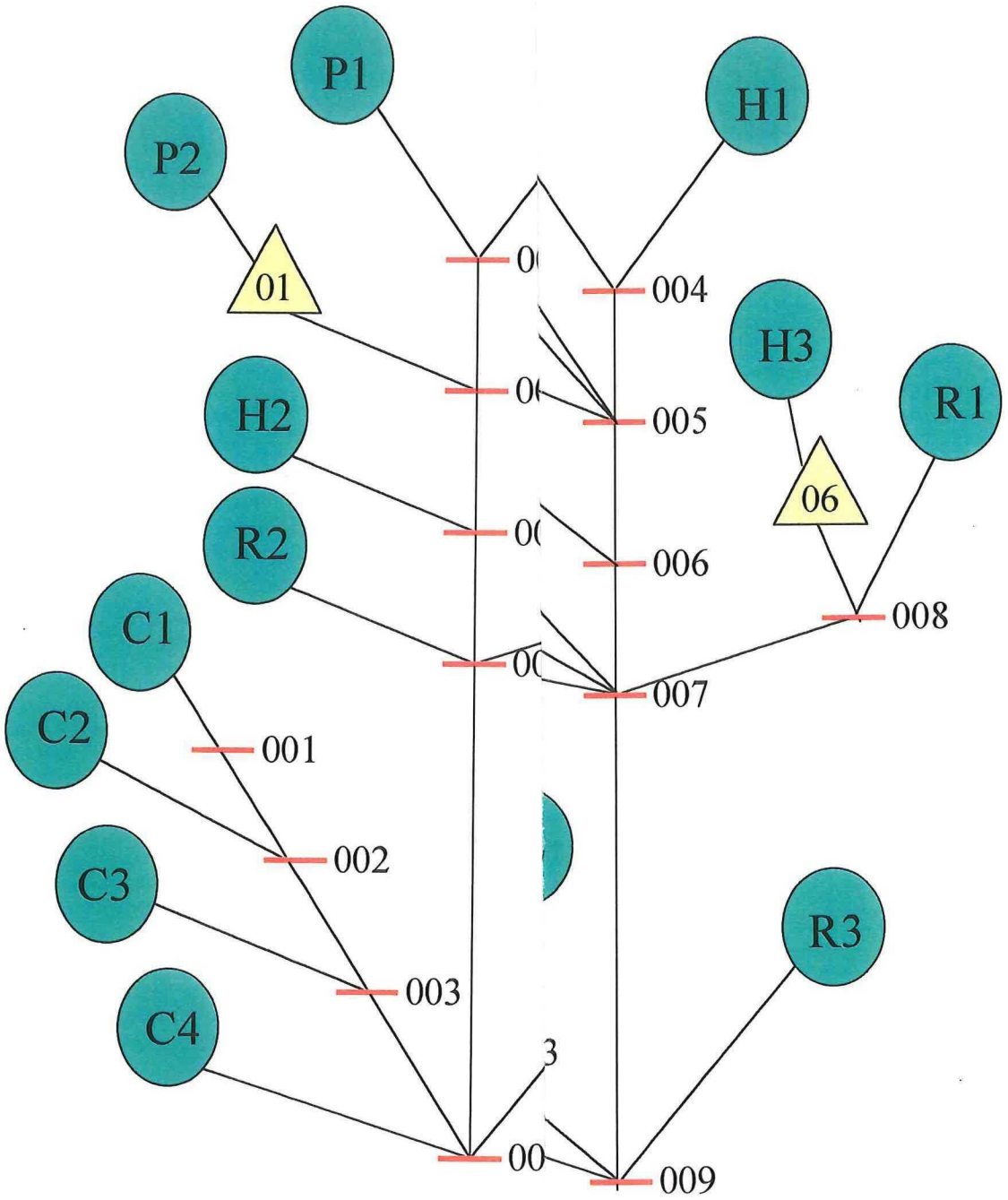
3. VOLUME DATA

Elevation (ft)	Depth (ft)	Area (sq. ft)	Area (acres)	INCREM. vol.(ft^3)	CUMUL. VOLUME (acre-ft)	(gal)
1542.0	0.0	960	0.022	0	0.000	0
1542.5	0.5	1420	0.033	237	0.005	1770
1543.0	1.0	1880	0.043	822	0.024	7921
1543.5	1.5	2340	0.054	1053	0.048	15797
1544.0	2.0	2800	0.064	1283	0.078	25396
1544.5	2.5	3430	0.079	1555	0.114	37026
1545.0	3.0	4060	0.093	1870	0.157	51016
1545.5	3.5	4700	0.108	2188	0.207	67382
1546.0	4.0	5320	0.122	2503	0.264	86108
1546.5	4.5	5600	0.129	2730	0.327	106526
1547.0	5.0	5900	0.135	2875	0.393	128029
1547.5	5.5	6200	0.142	3025	0.462	150653

Sugarbush Lincoln Peak
Hydrologic Analysis
Stormwater Model Schematic
Pre-development Condition



Existing Co Post-Development



03/05/2003

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Predevelopment**

Subwatershed: C1

Area (sqmi): 1.66
Area (acres): 1063

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	(acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	3.93	0.00614	0.4%	30	117.9
A	Impervious	0.120	0.00019	0.0%	98	11.7
A	Open	2.57	0.00401	0.2%	39	100.2
B	Forest	9.99	0.0156	0.9%	55	549.7
B	Open	0.352	0.00055	0.0%	61	21.4
C	Forest	804	1.26	75.6%	70	56281 .1
C	Impervious	0.441	0.00069	0.0%	98	43.2
C	Open	173	0.270	16.2%	74	12775.7
D	Forest	64.7	0.101	6.1%	77	4983.4
D	Impervious	0.0201	0.00003	0.0%	98	2.0
D	Open	4.33	0.00676	0.4%	80	346.2
		1063.13	1.66	100.0%		75232.4

Weighted Curve Number: 70.8
Total Impervious Area: 0.581 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
300	Overland	33.3%	1	1.47	0.0566
4000	Shallow Conc. Flow	35.0%	4	6.49	0.171
6050	Small tributary	13.2%	5	6.94	0.242
10350	Total Distance Traveled			Sum Tt:	0.470

Tc, Time of Concentration: 0.470
28.2

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Predevelopment**

Subwatershed: C2

Area (sqmi): 0.0781
Area (acres): 50.0

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	(acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	2.60	0.00407	5.2%	30	78.1
A	Impervious	0.101	0.00016	0.2%	98	9.9
C	Forest	30.6	0.0478	61.2%	70	2141.4
C	Gravel	0.0323	0.00005	0.1%	89	2.9
C	Impervious	2.84	0.00444	5.7%	98	278.6
C	Open	13.8	0.0216	27.7%	74	1024.5
		50.0	0.0781	100.0%		3535.3

Weighted Curve Number: 70.7
Total Impervious Area: 2.98 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	26.7%	1	1.31	0.0317
2350	Shallow Conc. Flow	28.9%	4	5.92	0.110
700	Small Tributary	12.9%	5	6.87	0.0283
1100	Small Tributary	6.8%	5	5.05	0.0605
4300	Total Distance Traveled			Sum Tt:	0.231

Tc, Time of Concentration: 0.231
13.9

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Predevelopment**

Subwatershed: C2A

Area (sqmi): 0.0244
Area (acres): 15.6

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	(acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	14.5	0.0226	92.9%	30	434.7
C	Forest	1.11	0.00173	7.1%	72	79.6
		15.60	0.0244	100.0%		514.4

Weighted Curve Number: 33.0
Total Impervious Area: 0.00 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	13.30%	1	0.92	0.0455
1400	Shallow Conc. Flow	10.70%	4	3.66	0.106
750	Small Tributary	8.00%	5	5.46	0.0382
2300	Total Distance Traveled				
				Sum Tt:	0.190

Tc, Time of Concentration: 0.190
11.4

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Predevelopment**

Subwatershed: C3

Area (sqmi): 0.0334
Area (acres): 21.4

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	(acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	20.7	0.0324	96.9%	30	622.0
A	Gravel	0.255	0.00040	1.2%	76	19.4
A	Impervious	0.0576	0.00009	0.3%	98	5.6
C	Forest	0.262	0.00041	1.2%	70	18.4
C	Gravel	0.0899	0.00014	0.4%	89	8.0
		21.4	0.0334	100.0%		673.4

Weighted Curve Number: 31.5
Total Impervious Area: 0.40 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	26.7%	1	1.31	0.0317
730	Shallow Conc. Flow	10.7%	4	3.66	0.0553
800	Small Tributary	5.6%	5	4.60	0.0483
1680	Total Distance Traveled			Sum Tt:	0.1354

Tc, Time of Concentration: 0.135
8.1

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Predevelopment**

Subwatershed: C3A

Area (sqmi): 0.00472
Area (acres): 3.02

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	Area (acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	1.81	0.00283	60.0%	30	54.3
C	Forest	1.21	0.00189	40.0%	70	84.5
		3.02	0.00472	100.0%		138.8

Weighted Curve Number: 46.0
Total Impervious Area: 0.00 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	8.0%	1	0.70	0.0592
550	Shallow Conc. Flow	10.0%	4	3.55	0.0431
700	Total Distance Traveled			Sum Tt:	0.1023

Tc, Time of Concentration: 0.102
6.1

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Predevelopment**
Subwatershed: C4

Area (sqmi): 0.404
Area (acres): 259

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	(acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Brush	6.34	0.00991	2.5%	30	190.3
A	Forest	38.8	0.0606	15.0%	30	1164.4
A	Gravel	0.715	0.00112	0.3%	76	54.3
A	Impervious	0.021	0.00003	0.0%	98	2.0
B	Brush	5.13	0.00802	2.0%	48	246.2
B	Forest	65.5	0.102	25.3%	55	3601.4
B	Gravel	4.26	0.00665	1.6%	85	362.0
B	Impervious	2.80	0.00438	1.1%	98	274.6
B	Open	1.83	0.00286	0.7%	61	111.7
C	Brush	3.92	0.00612	1.5%	65	254.6
C	Forest	90.9	0.142	35.2%	70	6366.5
C	Gravel	3.57	0.00557	1.4%	89	317.4
C	Impervious	1.33	0.00207	0.5%	98	129.9
C	Open	11.3	0.0176	4.4%	74	832.8
D	Brush	0.299	0.00047	0.1%	73	21.8
D	Forest	20.3	0.0317	7.8%	77	1562.3
D	Gravel	0.248	0.00039	0.1%	91	22.6
D	Open	1.14	0.00179	0.4%	80	91.4
	Water	0.244	0.00038	0.1%	100	24.4
		259	0.404	100.0%		15630.5

Weighted Curve Number: 60.4

Total Impervious Area: 12.9 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	26.7%	1	1.31	0.0317
3350	Shallow Conc. Flow	23.6%	4	5.37	0.173
3175	Small Tributary	7.9%	5	5.43	0.163
6675	Total Distance Traveled				
				Sum Tt:	0.368
				Tc, Time of Concentration:	0.368
					22.1

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Predevelopment**

Subwatershed: H1

Area (sqmi): 0.0884
Area (acres): 56.6

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	Area (acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	10.1	0.0158	17.9%	30	303.0
A	Gravel	0.715	0.00112	1.3%	76	54.3
A	Impervious	0.0183	0.00003	0.0%	98	1.8
A	Open	11.1	0.0174	19.7%	39	434.8
C	Forest	19.5	0.0305	34.5%	70	1364.9
C	Impervious	0.0047	0.00001	0.0%	98	0.5
C	Open	15.1	0.0236	26.7%	74	1115.7
		56.6	0.0884	100.0%		3274.8

Weighted Curve Number: 57.9
Total Impervious Area: 0.74 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	12.0%	1	0.87	0.0480
2100	Shallow Conc. Flow	29.1%	4	5.94	0.0983
1550	Small Tributary	11.0%	5	6.36	0.0677
3800	Total Distance Traveled			Sum Tt:	0.2140

Tc, Time of Concentration: 0.214
12.8

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Predevelopment**

Subwatershed: H2

Area (sqmi): 0.00150
Area (acres): 0.962

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	(acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	0.962	0.00150	100.0%	30	28.9
		0.962	0.00150	100.0%		28.9

Weighted Curve Number: 30.0
Total Impervious Area: 0.00 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	10.0%	1	0.79	0.0528
450	Shallow Conc. Flow	6.7%	4	2.92	0.0427
600	Total Distance Traveled				
				Sum Tt:	0.0955

Tc, Time of Concentration: 0.0955
5.7

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Predevelopment**

Subwatershed: H3

Area (sqmi): 0.0140
Area (acres): 8.97

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	(acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	8.97	0.0140	100.0%	30	269.0
		8.97	0.0140	100.0%		269.0

Weighted Curve Number: 30.0
Total Impervious Area: 0.00 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	13.3%	1	0.92	0.0455
720	Shallow Conc. Flow	5.5%	4	2.66	0.0752
300	Small Tributary	6.7%	5	5.01	0.0166
1170	Total Distance Traveled			Sum Tt:	0.1374

Tc, Time of Concentration: 0.137
8.2

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Predevelopment**

Subwatershed: H4

Area (sqmi): 0.00629
Area (acres): 4.02

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	(acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	4.02	0.00629	100.0%	30	120.7
		4.02	0.00629	100.0%		120.7

Weighted Curve Number: 30.0
Total Impervious Area: 0.00 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	10.0%	1	0.79	0.0528
750	Small Tributary	8.0%	5	5.46	0.0382
900	Total Distance Traveled			Sum Tt:	0.0909

Tc, Time of Concentration: 0.0909
5.5

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Predevelopment**

Subwatershed: H5

Area (sqmi): 0.00430
Area (acres): 2.75

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	Area (acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	2.52	0.00393	91.5%	30	75.5
A	Gravel	0.0176	0.00003	0.6%	76	1.3
A	Impervious	0.0359	0.00006	1.3%	98	3.5
A	Open	0.180	0.00028	6.6%	39	7.0
		2.75	0.00430	100.0%		87.4

Weighted Curve Number: 31.8
Total Impervious Area: 0.00 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	12.0%	1	0.87	0.0480
260	Shallow Conc. Flow	8.0%	4	3.19	0.0227
560	Small Tributary	8.2%	5	5.52	0.0282
970	Total Distance Traveled			Sum Tt:	0.0988

Tc, Time of Concentration: 0.0988
5.9

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Predevelopment**

Subwatershed: P1

Area (sqmi): 0.0550
Area (acres): 35.2

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	(acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	16.2	0.0253	46.1%	30	486.4
A	Impervious	0.0280	0.00004	0.1%	98	2.7
A	Open	6.15	0.00960	17.5%	39	239.7
C	Forest	10.1	0.0157	28.6%	70	705.5
C	Open	2.74	0.00427	7.8%	74	202.4
		35.20	0.0550	100.0%		1636.8

Weighted Curve Number: 46.5
Total Impervious Area: 0.03 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	33.3%	1	1.47	0.0283
1360	Shallow Conc. Flow	22.8%	4	5.28	0.0716
2890	Small Tributary	9.7%	5	5.99	0.134
425	Culvert	8.5%	3	5.71	0.0207
4825	Total Distance Traveled			Sum Tt:	0.255

Tc, Time of Concentration: 0.255
15.3

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Predevelopment**

Subwatershed: R1

Area (sqmi): 0.466
Area (acres): 298

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	(acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	6.28	0.00980	2.1%	30	188.3
A	Gravel	0.0109	0.00002	0.0%	76	0.8
A	Impervious	0.395	0.00062	0.1%	98	38.7
A	Open	0.641	0.00100	0.2%	39	25.0
B	Forest	2.86	0.00446	1.0%	55	157.0
B	Gravel	0.777	0.00121	0.3%	85	66.0
B	Impervious	0.619	0.00097	0.2%	98	60.6
C	Forest	248	0.387	83.1%	70	17354.4
C	Gravel	2.20	0.00343	0.7%	89	195.5
C	Impervious	0.796	0.00124	0.3%	98	78.0
C	Open	35.9	0.0561	12.0%	74	2657.6
		298	0.466	100.0%		20822.0

Weighted Curve Number: 69.8
Total Impervious Area: 4.79 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	30.0%	1	1.39	0.0299
2400	Shallow Conc. Flow	34.2%	4	6.42	0.104
5730	Small tributary	18.0%	5	8.06	0.197
8280	Total Distance Traveled			Sum Tt:	0.331

Tc, Time of Concentration: 0.331
19.9

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Predevelopment**

Subwatershed: R2

Area (sqmi): 0.0176
Area (acres): 11.3

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	(acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	5.64	0.00881	50.0%	30	169.2
A	Gravel	0.519	0.00081	4.6%	76	39.5
A	Impervious	1.07	0.00167	9.5%	98	104.9
A	Open	1.45	0.00227	12.9%	39	56.6
B	Forest	1.44	0.00225	12.8%	55	79.3
B	Gravel	0.392	0.00061	3.5%	85	33.3
B	Impervious	0.262	0.00041	2.3%	98	25.6
C	Forest	0.325	0.00051	2.9%	70	22.8
C	Gravel	0.131	0.00020	1.2%	89	11.6
C	Impervious	0.0575	0.00009	0.5%	98	5.6
		11.29	0.0176	100.0%		548.36

Weighted Curve Number: 48.6
Total Impervious Area: 2.43 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	33.3%	1	1.47	0.0283
1200	Shallow Conc. Flow	11.7%	4	3.83	0.0871
2350	Small Tributary	3.0%	5	3.41	0.192
3700	Total Distance Traveled				
				Sum Tt:	0.307

Tc, Time of Concentration: 0.307
18.4

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Predevelopment**

Subwatershed: R2A

Area (sqmi): 0.00582
Area (acres): 3.72

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	Area (acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	3.72	0.00582	100.0%	30	111.7
		3.72	0.00582	100.0%		111.7

Weighted Curve Number: 30.0
Total Impervious Area: 0.00 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	9.3%	1	0.76	0.0548
1044	Shallow Conc. Flow	8.4%	4	3.26	0.0889
1194	Total Distance Traveled				
				Sum Tt:	0.1437

Tc, Time of Concentration: 0.144
8.6

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Predevelopment**

Subwatershed: R3

Area (sqmi): 0.183
Area (acres): 117

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	(acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Brush	3.80	0.00593	3.2%	30	113.9
A	Forest	40.8	0.0637	34.8%	30	1222.8
A	Gravel	3.53	0.00552	3.0%	76	268.4
A	Impervious	3.83	0.00599	3.3%	98	375.8
A	Open	0.351	0.00055	0.3%	39	13.7
B	Brush	0.012	0.00002	0.0%	48	0.6
B	Forest	9.86	0.0154	8.4%	55	542.1
B	Gravel	1.58	0.00247	1.3%	85	134.2
B	Impervious	2.16	0.00337	1.8%	98	211.3
B	Open	0.380	0.00059	0.3%	61	23.2
C	Forest	40.2	0.0629	34.4%	70	2816.1
C	Gravel	3.76	0.00588	3.2%	89	334.9
C	Impervious	1.75	0.00274	1.5%	98	171.7
C	Open	3.75	0.00586	3.2%	74	277.7
	Water	1.24	0.00194	1.1%	100	124.2
		117.00	0.1828	100.0%		6630.51

Weighted Curve Number: 56.7
Total Impervious Area: 16.6 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	20.0%	1	1.13	0.0369
4400	Shallow Conc. Flow	25.0%	4	5.52	0.222
825	Small Tributary	15.8%	5	7.57	0.0303
575	Small Tributary	8.7%	5	5.68	0.0281
2650	Small Tributary	7.2%	5	5.19	0.142
8600	Total Distance Traveled				
				Sum Tt:	0.459

Tc, Time of Concentration: 0.459
27.5

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Existing Conditions**

Subwatershed: C1

Area (sqmi): 1.66
Area (acres): 1063

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	Area (acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	3.93	0.00614	0.4%	30	117.9
A	Impervious	0.120	0.00019	0.0%	98	11.7
A	Open	2.57	0.00401	0.2%	39	100.2
B	Forest	9.99	0.0156	0.9%	55	549.7
B	Open	0.352	0.00055	0.0%	61	21.4
C	Forest	804	1.26	75.6%	70	56281.1
C	Impervious	0.441	0.00069	0.0%	98	43.2
C	Open	173	0.270	16.2%	74	12775.7
D	Forest	64.7	0.101	6.1%	77	4983.4
D	Impervious	0.0201	0.00003	0.0%	98	2.0
D	Open	4.33	0.00676	0.4%	80	346.2
		1063	1.66	100.0%		75232.4
	Weighted Curve Number:				70.8	
	Total Impervious Area:				0.58	acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
300	Overland	33.3%	1	1.47	0.0566
4000	Shallow Conc. Flow	35.0%	4	6.49	0.171
6050	Small tributary	13.2%	5	6.94	0.242
10350	Total Distance Traveled			Sum Tt:	0.470
				Tc, Time of Concentration:	0.470
					28.2

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Existing Conditions**

Subwatershed: C2

Area (sqmi): 0.0819
Area (acres): 52.4

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	Area (acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	4.21	0.00658	8.0%	30	126.3
A	Gravel	0.647	0.00101	1.2%	76	49.1
A	Impervious	0.722	0.00113	1.4%	98	70.8
A	Open	0.005	0.00001	0.0%	39	0.2
C	Forest	30.2	0.0472	57.6%	70	2113.3
C	Impervious	2.70	0.00422	5.2%	98	264.9
C	Open	14.0	0.0218	26.6%	74	1032.4
		52.4	0.0819	100.0%		3657.0

Weighted Curve Number: 69.8
Total Impervious Area: 4.07 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	26.7%	1	1.31	0.0317
2350	Shallow Conc. Flow	28.9%	4	5.92	0.110
700	Culvert	12.9%	3	7.04	0.0276
1100	Small Tributary	6.8%	5	5.05	0.0605
4300	Total Distance Traveled			Sum Tt:	0.230

Tc, Time of Concentration: 0.230
13.8

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Existing Conditions**

Subwatershed: C3

Area (sqmi): 0.0390
Area (acres): 25.0

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	Area (acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	21.7	0.0339	86.9%	30	650.6
A	Gravel	1.61	0.00251	6.4%	76	122.2
A	Impervious	0.295	0.00046	1.2%	98	28.9
C	Forest	0.874	0.00137	3.5%	70	61.2
C	Gravel	0.318	0.00050	1.3%	89	28.3
C	Impervious	0.179	0.00028	0.7%	98	17.5
		24.96	0.0390	100.0%		908.7

Weighted Curve Number: 36.4
Total Impervious Area: 2.08 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	26.7%	1	1.31	0.0317
730	Shallow Conc. Flow	10.7%	4	3.66	0.0553
800	Small Tributary	5.6%	5	4.60	0.0483
1680	Total Distance Traveled			Sum Tt:	0.1354

Tc, Time of Concentration: 0.135
8.1

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Existing Conditions**

Subwatershed: C4

Area (sqmi): 0.405
Area (acres): 259

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	Area (acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Brush	6.34	0.00991	2.4%	30	190.3
A	Forest	38.8	0.0607	15.0%	30	1164.5
A	Gravel	0.716	0.00112	0.3%	76	54.4
A	Impervious	0.0207	0.00003	0.0%	98	2.0
B	Brush	5.13	0.00802	2.0%	48	246.2
B	Forest	65.5	0.102	25.2%	55	3601.4
B	Gravel	4.26	0.00665	1.6%	85	362.0
B	Impervious	2.80	0.00438	1.1%	98	274.6
B	Open	1.83	0.00286	0.7%	61	111.7
C	Brush	3.92	0.00612	1.5%	65	254.6
C	Forest	91.7	0.143	35.4%	70	6421.0
C	Gravel	3.58	0.00559	1.4%	89	318.6
C	Impervious	1.33	0.00207	0.5%	98	129.9
C	Open	11.3	0.0176	4.3%	74	832.8
D	Brush	0.299	0.00047	0.1%	73	21.8
D	Forest	20.3	0.0317	7.8%	77	1562.3
D	Gravel	0.248	0.00039	0.1%	91	22.6
D	Open	1.14	0.00179	0.4%	80	91.4
	Water	0.244	0.00038	0.1%	100	24.4
		259.43	0.405	100.0%		15686.5

Weighted Curve Number: 60.5
Total Impervious Area: 13.0 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	26.7%	1	1.31	0.0317
3350	Shallow Conc. Flow	23.6%	4	5.37	0.173
3175	Small Tributary	7.9%	5	5.43	0.163
6675	Total Distance Traveled				
				Sum Tt:	0.368
				Tc, Time of Concentration:	0.368
					22.1

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Existing Conditions**

Subwatershed: H1

Area (sqmi): 0.0798
Area (acres): 51.1

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	Area (acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	6.39	0.00998	12.5%	30	191.6
A	Impervious	0.02	0.00003	0.0%	98	1.6
A	Open	10.1	0.0158	19.8%	39	394.5
C	Forest	19.5	0.0305	38.2%	70	1364.9
C	Impervious	0.0047	0.00001	0.0%	98	0.5
C	Open	15.1	0.0236	29.5%	74	1115.7
		51.1	0.0798	100.0%		3068.7

Weighted Curve Number: 60.1
Total Impervious Area: 0.02 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	12.0%	1	0.87	0.0480
2100	Shallow Conc. Flow	29.1%	4	5.94	0.0983
1550	Small Tributary	11.0%	5	6.36	0.0677
3800	Total Distance Traveled				
				Sum Tt:	0.214

Tc, Time of Concentration: 0.214
12.8

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Existing Conditions**

Subwatershed: H2

Area (sqmi): 0.0190
Area (acres): 12.2

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	Area (acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	9.54	0.0149	78.3%	30	286.3
A	Gravel	1.52	0.00237	12.4%	76	115.2
A	Impervious	0.178	0.00028	1.5%	98	17.4
A	Open	0.954	0.00149	7.8%	39	37.2
		12.19	0.0190	100.0%		456.2

Weighted Curve Number: 37.4
Total Impervious Area: 1.69 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	33.3%	1	1.47	0.0283
1600	Shallow Conc. Flow	11.3%	4	3.76	0.118
730	Small Tributary	8.2%	5	5.52	0.0367
2480	Total Distance Traveled			Sum Tt:	0.183

Tc, Time of Concentration: 0.183
11.0

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Existing Conditions**

Subwatershed: P1

Area (sqmi): 0.0550
Area (acres): 35.2

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	Area (acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	16.2	0.0253	46.1%	30	486.4
A	Impervious	0.0280	0.00004	0.1%	98	2.7
A	Open	6.15	0.00960	17.5%	39	239.7
C	Forest	10.1	0.0157	28.6%	70	705.5
C	Open	2.74	0.00427	7.8%	74	202.4
		35.2	0.0550	100.0%		1636.8
			Weighted Curve Number:		46.5	
			Total Impervious Area:		0.03	acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	33.3%	1	1.47	0.0283
1360	Shallow Conc. Flow	22.8%	4	5.28	0.0716
2890	Small Tributary	9.7%	5	5.99	0.134
425	Culvert	8.5%	3	5.71	0.0207
4825	Total Distance Traveled			Sum Tt:	0.255
				Tc, Time of Concentration:	0.255
					15.3

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Existing Conditions**

Subwatershed: P2

Area (sqmi): 0.0296
Area (acres): 18.9

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	Area (acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	4.03	0.00629	21.3%	30	120.8
A	Gravel	8.48	0.0132	44.8%	76	644.5
A	Impervious	1.02	0.00159	5.4%	98	99.5
A	Open	4.43	0.00692	23.4%	39	172.7
C	Forest	0.0002	0.0000	0.0%	70	0.0
C	Impervious	0.0910	0.00014	0.5%	98	8.9
C	Open	0.883	0.00138	4.7%	74	65.3
		18.93	0.0296	100.0%		1111.8

Weighted Curve Number: 58.7
Total Impervious Area: 9.59 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	10.0%	1	0.79	0.0528
1050	Shallow Conc. Flow	11.4%	4	3.78	0.0772
150	Culvert	2.7%	3	3.20	0.0130
570	Ditch	5.6%	2	3.51	0.0451
320	Culvert	6.3%	3	4.91	0.0181
2240	Total Distance Traveled			Sum Tt:	0.2062

Tc, Time of Concentration: 0.206
12.4

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Existing Conditions**

Subwatershed: R1

Area (sqmi): 0.467
Area (acres): 299

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	Area (acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	6.42	0.0100	2.1%	30	192.7
A	Gravel	0.476	0.00074	0.2%	76	36.2
A	Impervious	0.414	0.00065	0.1%	98	40.6
A	Open	0.510	0.00080	0.2%	39	19.9
B	Forest	2.86	0.00447	1.0%	55	157.2
B	Gravel	0.778	0.00122	0.3%	85	66.1
B	Impervious	0.620	0.00097	0.2%	98	60.7
C	Forest	248	0.387	82.9%	70	17354.4
C	Gravel	2.20	0.00343	0.7%	89	195.5
C	Impervious	0.796	0.00124	0.3%	98	78.0
C	Open	35.9	0.0561	12.0%	74	2657.6
		298.91	0.467	100.0%		20859.0

Weighted Curve Number: 69.8
Total Impervious Area: 5.28 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	30.0%	1	1.39	0.0299
2400	Shallow Conc. Flow	34.2%	4	6.42	0.104
5730	Small tributary	18.0%	5	8.06	0.197
8280	Total Distance Traveled				
				Sum Tt:	0.331

Tc, Time of Concentration: 0.331
19.9

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Existing Conditions**

Subwatershed: R2

Area (sqmi): 0.0193
Area (acres): 12.4

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	Area (acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	6.72	0.0105	54.4%	30	201.5
A	Gravel	0.512	0.00080	4.1%	76	38.9
A	Impervious	1.07	0.00167	8.7%	98	104.9
A	Open	1.45	0.00227	11.7%	39	56.6
B	Forest	1.44	0.00225	11.7%	55	79.1
B	Gravel	0.391	0.00061	3.2%	85	33.2
B	Impervious	0.260	0.00041	2.1%	98	25.5
C	Forest	0.324	0.00051	2.6%	70	22.7
C	Gravel	0.130	0.00020	1.1%	89	11.6
C	Impervious	0.0575	0.00009	0.5%	98	5.6
		12.35	0.0193	100.0%		579.64

Weighted Curve Number: 46.9
Total Impervious Area: 2.42 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	33.3%	1	1.47	0.0283
1200	Shallow Conc. Flow	11.7%	4	3.83	0.0871
2350	Small Tributary	3.0%	5	3.41	0.192
3700	Total Distance Traveled			Sum Tt:	0.307

Tc, Time of Concentration: 0.307
18.4

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Existing Conditions**

Subwatershed: R3

Area (sqmi): 0.191
Area (acres): 122

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	Area (acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Brush	3.80	0.00593	3.1%	30	113.9
A	Forest	45.4	0.0709	37.2%	30	1360.7
A	Gravel	3.54	0.00553	2.9%	76	268.9
A	Impervious	4.28	0.00669	3.5%	98	419.4
A	Open	0.350	0.00055	0.3%	39	13.6
B	Brush	0.0121	0.00002	0.0%	48	0.6
B	Forest	9.86	0.0154	8.1%	55	542.0
B	Gravel	1.58	0.00247	1.3%	85	134.2
B	Impervious	2.16	0.00337	1.8%	98	211.3
B	Open	0.380	0.00059	0.3%	61	23.2
C	Forest	40.2	0.0629	33.0%	70	2816.1
C	Gravel	3.76	0.00588	3.1%	89	334.9
C	Impervious	1.75	0.00274	1.4%	98	171.7
C	Open	3.75	0.00586	3.1%	74	277.7
	Water	1.24	0.00194	1.0%	100	124.2
		122	0.1907	100.0%		6812.46

Weighted Curve Number: 55.8
Total Impervious Area: 17.1 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	20.0%	1	1.13	0.0369
4400	Shallow Conc. Flow	25.0%	4	5.52	0.222
825	Small Tributary	15.8%	5	7.57	0.0303
575	Culvert	8.7%	3	5.77	0.0277
2650	Small Tributary	7.2%	5	5.19	0.142
8600	Total Distance Traveled			Sum Tt:	0.458

Tc, Time of Concentration: 0.458
27.5

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Post Development**

Subwatershed: C1

Area (sqmi): 1.66
Area (acres): 1063

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	Area (acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	3.93	0.00614	0.4%	30	117.9
A	Impervious	0.12	0.00019	0.0%	98	11.7
A	Open	2.57	0.00401	0.2%	39	100.2
B	Forest	9.99	0.0156	0.9%	55	549.7
B	Open	0.35	0.00055	0.0%	61	21.4
C	Forest	804	1.26	75.6%	70	56281.1
C	Impervious	0.44	0.00069	0.0%	98	43.2
C	Open	173	0.270	16.2%	74	12775.7
D	Forest	64.7	0.101	6.1%	77	4983.4
D	Impervious	0.02	0.00003	0.0%	98	2.0
D	Open	4.33	0.00676	0.4%	80	346.2
		1063	1.66	100.0%		75232.4

Weighted Curve Number: 70.8
Total Impervious Area: 0.58 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
300	Overland	33.3%	1	1.47	0.0566
4000	Shallow Conc. Flow	35.0%	4	6.49	0.171
6050	Small tributary	13.2%	5	6.94	0.242
10350	Total Distance Traveled			Sum Tt:	0.470

Tc, Time of Concentration: 0.470
28.2

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Post Development**

Subwatershed: C2

Area (sqmi): 0.0768
Area (acres): 49.2

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	Area (acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	2.32	0.00362	4.7%	30	69.5
A	Impervious	0.10	0.00016	0.2%	98	9.9
C	Forest	30.2	0.0472	61.4%	70	2114.5
C	Impervious	2.71	0.00424	5.5%	98	265.7
C	Open	13.8	0.0216	28.2%	74	1024.5
		49.2	0.0768	100.0%		3484.0

Weighted Curve Number: 70.8
Total Impervious Area: 2.81 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	26.7%	1	1.31	0.0317
2350	Shallow Conc. Flow	28.9%	4	5.92	0.110
700	Culvert	12.9%	3	7.04	0.0276
1100	Small Tributary	6.8%	5	5.05	0.0605
4300	Total Distance Traveled			Sum Tt:	0.230

Tc, Time of Concentration: 0.230
13.8

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Post Development**

Subwatershed: C3

Area (sqmi): 0.0347
Area (acres): 22.2

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	Area (acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	19.1	0.0298	85.8%	30	572.4
A	Gravel	0.165	0.00026	0.7%	76	12.5
A	Impervious	0.371	0.00058	1.7%	98	36.3
A	Open	1.72	0.00269	7.7%	39	67.1
C	Forest	0.537	0.00084	2.4%	70	37.6
C	Gravel	0.178	0.00028	0.8%	89	15.9
C	Impervious	0.131	0.00021	0.6%	98	12.9
C	Open	0.0529	0.00008	0.2%	74	3.9
		22.2	0.0347	100.0%		758.6

Weighted Curve Number: 34.1
Total Impervious Area: 0.84 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	26.7%	1	1.31	0.0317
730	Shallow Conc. Flow	10.7%	4	3.66	0.0553
800	Small Tributary	5.6%	5	4.60	0.0483
1680	Total Distance Traveled				
				Sum Tt:	0.1354

Tc, Time of Concentration: 0.135
8.1

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Post Development**

Subwatershed: C4

Area (sqmi): 0.404
Area (acres): 259

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	Area (acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Brush	6.34	0.00991	2.5%	30	190.3
A	Forest	38.8	0.0606	15.0%	30	1163.9
A	Gravel	0.71	0.00112	0.3%	76	54.3
A	Impervious	0.02	0.00003	0.0%	98	2.0
A	Open	0.02	0.00002	0.0%	39	0.6
B	Brush	5.13	0.00802	2.0%	48	246.2
B	Forest	65.5	0.102	25.3%	55	3601.4
B	Gravel	4.26	0.00665	1.6%	85	362.0
B	Impervious	2.80	0.00438	1.1%	98	274.6
B	Open	1.83	0.00286	0.7%	61	111.7
C	Brush	3.92	0.00612	1.5%	65	254.6
C	Forest	88.8	0.139	34.4%	70	6218.8
C	Gravel	4.08	0.00638	1.6%	89	363.1
C	Impervious	1.32	0.00206	0.5%	98	129.3
C	Open	12.1	0.0188	4.7%	74	892.2
C	Wetland (Forest)	0.80	0.00125	0.3%	70	56.0
D	Brush	0.30	0.00047	0.1%	73	21.8
D	Forest	20.3	0.0317	7.8%	77	1562.3
D	Gravel	0.25	0.00039	0.1%	91	22.6
D	Open	1.14	0.00179	0.4%	80	91.4
	Water	0.24	0.00038	0.1%	100	24.4
		259	0.404	100.0%		15643.4

Weighted Curve Number: 60.5
Total Impervious Area: 13.4 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	26.7%	1	1.31	0.0317
3350	Shallow Conc. Flow	23.6%	4	5.37	0.173
3175	Small Tributary	7.9%	5	5.43	0.163
6675	Total Distance Traveled			Sum Tt:	0.368

Tc, Time of Concentration: 0.368
22.1

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Post Development**

Subwatershed: H1

Area (sqmi): 0.0884
Area (acres): 56.6

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	Area (acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	9.40	0.0147	16.6%	30	281.9
A	Gravel	0.20	0.00031	0.4%	76	15.2
A	Impervious	0.17	0.00027	0.3%	98	16.7
A	Open	12.2	0.0191	21.6%	39	476.3
C	Forest	19.5	0.0305	34.5%	70	1364.9
C	Impervious	0.0047	0.00001	0.0%	98	0.5
C	Open	15.1	0.0236	26.7%	74	1115.7
		56.6	0.0884	100.0%		3271.2

Weighted Curve Number: 57.8
Total Impervious Area: 0.38 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	12.0%	1	0.87	0.0480
2100	Shallow Conc. Flow	29.1%	4	5.94	0.0983
1550	Small Tributary	11.0%	5	6.36	0.0677
3800	Total Distance Traveled			Sum Tt:	0.2140

Tc, Time of Concentration: 0.214
12.8

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Post Development**

Subwatershed: H2

Area (sqmi): 0.00851
Area (acres): 5.45

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	Area (acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	0.08	0.00012	1.4%	30	2.3
A	Gravel	0.33	0.00052	6.1%	76	25.1
A	Impervious	3.13	0.00489	57.4%	98	306.7
A	Open	1.87	0.00292	34.3%	39	72.9
	Water	0.05	0.00007	0.8%	100	4.5
		5.45	0.00852	100.0%		411.5

Weighted Curve Number: 75.5
Total Impervious Area: 3.46 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
180	Overland	17.8%	1	1.06	0.0470
975	Culvert	6.0%	3	4.79	0.0565
1155	Total Distance Traveled			Sum Tt:	0.1035

Tc, Time of Concentration: 0.104
6.2

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Post Development**

Subwatershed: H3

Area (sqmi): 0.00113
Area (acres): 0.724

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	Area (acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Impervious	0.716	0.00112	98.9%	98	70.2
A	Open	0.00814	0.00001	1.1%	39	0.3
		0.724	0.00113	100.0%		70.5
	Weighted Curve Number:				97.3	
	Total Impervious Area:				0.72	acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	10.0%	1	0.79	0.0528
480	Culvert	5.0%	3	4.37	0.0305
630	Total Distance Traveled				
				Sum Tt:	0.0833
			Tc, Time of Concentration:		0.0833
					5.0

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Post Development**

Subwatershed: H4

Area (sqmi): 0.00149
Area (acres): 0.955

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	Area (acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	0.119	0.00019	12.5%	30	3.6
A	Gravel	0.0244	0.00004	2.6%	76	1.9
A	Impervious	0.0203	0.00003	2.1%	98	2.0
A	Open	0.791	0.00124	82.8%	39	30.9
		0.955	0.00149	100.0%		38.3

Weighted Curve Number: 40.1
Total Impervious Area: 0.04 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	12.0%	1	0.87	0.0480
90	Small Tributary	11.1%	5	6.39	0.00391
240	Total Distance Traveled				
				Sum Tt:	0.0519

Tc, Time of Concentration: 0.052
3.1

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Post Development**

Subwatershed: H5

Area (sqmi): 0.00430
Area (acres): 2.75

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	Area (acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	1.93	0.00302	70.3%	30	58.0
A	Gravel	0.01	0.00002	0.5%	76	1.0
A	Impervious	0.29	0.00045	10.5%	98	28.2
A	Open	0.52	0.00081	18.8%	39	20.2
		2.75	0.00430	100.0%		107.3

Weighted Curve Number: 39.0
Total Impervious Area: 0.30 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	12.0%	1	0.87	0.0480
200	Shallow Conc. Flow	8.0%	4	3.19	0.0174
60	Culvert	10.0%	3	6.19	0.0027
560	Small Tributary	8.2%	5	5.52	0.0282
970	Total Distance Traveled			Sum Tt:	0.0963

Tc, Time of Concentration: 0.0963
5.8

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Post Development**

Subwatershed: H6

Area (sqmi): 0.00027
Area (acres): 0.170

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	Area (acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Impervious	0.050	0.00008	29.3%	98	4.9
A	Open	0.120	0.00019	70.7%	39	4.7
		0.170	0.00027	100.0%		9.6
			Weighted Curve Number:		56.3	
			Total Impervious Area:		0.05	acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
25	Overland	8.0%	1	0.70	0.0099
240	Culvert	2.5%	3	3.08	0.0216
265	Total Distance Traveled			Sum Tt:	0.0315
			Tc, Time of Concentration:		0.0315
					1.9

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Post Development**

Subwatershed: P1

Area (sqmi): 0.0550
Area (acres): 35.2

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	Area (acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	16.2	0.0253	46.1%	30	486.4
A	Impervious	0.03	0.00004	0.1%	98	2.7
A	Open	6.15	0.00960	17.5%	39	239.7
C	Forest	10.1	0.0157	28.6%	70	705.5
C	Open	2.74	0.00427	7.8%	74	202.4
		35.20	0.0550	100.0%		1636.8
			Weighted Curve Number:		46.5	
			Total Impervious Area:		0.03	acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	33.3%	1	1.47	0.0283
1360	Shallow Conc. Flow	22.8%	4	5.28	0.0716
2890	Small Tributary	9.7%	5	5.99	0.134
425	Culvert	8.5%	3	5.71	0.0207
4825	Total Distance Traveled			Sum Tt:	0.255
			Tc, Time of Concentration:		0.255
					15.3

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Post Development**

Subwatershed: PL1

Area (sqmi): 0.0213
Area (acres): 13.6

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	Area (acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	3.21	0.00502	23.6%	30	96.4
A	Gravel	2.85	0.00445	20.9%	76	216.4
A	Impervious	1.68	0.00262	12.3%	98	164.6
A	Open	4.74	0.00740	34.8%	39	184.8
C	Gravel	0.0263	0.00004	0.2%	89	2.3
C	Impervious	0.0683	0.00011	0.5%	98	6.7
C	Open	1.01	0.00158	7.4%	74	74.9
	Water	0.0334	0.00005	0.2%	100	3.3
		13.62	0.0213	100.0%		749.3

Weighted Curve Number: 55.0
Total Impervious Area: 4.62 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	10.0%	1	0.79	0.0528
1050	Shallow Conc. Flow	11.3%	4	3.76	0.0775
810	Culvert	5.1%	3	4.41	0.0510
2010	Total Distance Traveled				
				Sum Tt:	0.1813

Tc, Time of Concentration: 0.181
10.9

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Post Development**

Subwatershed: PL2

Area (sqmi): 0.00839
Area (acres): 5.37

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	Area (acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	0.210	0.00033	3.9%	30	6.3
A	Gravel	2.89	0.00451	53.7%	76	219.3
A	Impervious	0.672	0.00105	12.5%	98	65.8
A	Open	1.59	0.00249	29.6%	39	62.0
	Water	0.0123	0.00002	0.2%	100	1.2
		5.37	0.00839	100.0%		354.7

Weighted Curve Number: 66.0
Total Impervious Area: 3.56 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	6.7%	1	0.64	0.0649
180	Shallow Conc. Flow	4.4%	4	2.39	0.0209
840	Culvert	4.1%	3	3.95	0.0590
1170	Total Distance Traveled			Sum Tt:	0.1449

Tc, Time of Concentration: 0.145
8.7

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Post Development**

Subwatershed: PL3

Area (sqmi): 0.00638
Area (acres): 4.08

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	Area (acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	0.150	0.00023	3.7%	30	4.5
A	Gravel	2.10	0.00328	51.4%	76	159.6
A	Impervious	0.563	0.00088	13.8%	98	55.2
A	Open	1.24	0.00194	30.4%	39	48.4
	Water	0.0283	0.00004	0.7%	100	2.8
		4.08	0.00638	100.0%		270.5

Weighted Curve Number: 66.3
Total Impervious Area: 2.66 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	8.0%	1	0.70	0.0592
135	Shallow Conc. Flow	8.9%	4	3.35	0.0112
625	Culvert	4.5%	3	4.14	0.0419
910	Total Distance Traveled			Sum Tt:	0.1123

Tc, Time of Concentration: 0.112
6.7

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Post Development**

Subwatershed: R1

Area (sqmi): 0.466
Area (acres): 298

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	Area (acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	5.85	0.00914	2.0%	30	175.6
A	Gravel	0.179	0.00028	0.1%	76	13.6
A	Impervious	0.398	0.00062	0.1%	98	39.0
A	Open	0.892	0.00139	0.3%	39	34.8
B	Forest	2.86	0.00446	1.0%	55	157.0
B	Gravel	0.777	0.00121	0.3%	85	66.0
B	Impervious	0.619	0.00097	0.2%	98	60.6
C	Forest	248	0.387	83.1%	70	17354.4
C	Gravel	2.20	0.00343	0.7%	89	195.5
C	Impervious	0.796	0.00124	0.3%	98	78.0
C	Open	35.9	0.05611	12.0%	74	2657.6
		298	0.466	100.0%		20832.2

Weighted Curve Number: 69.8
Total Impervious Area: 4.97 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	30.0%	1	1.39	0.0299
2400	Shallow Conc. Flow	34.2%	4	6.42	0.104
5730	Small tributary	18.0%	5	8.06	0.197
8280	Total Distance Traveled			Sum Tt:	0.331

Tc, Time of Concentration: 0.331
19.9

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Post Development**

Subwatershed: R2

Area (sqmi): 0.0176
Area (acres): 11.3

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	Area (acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Forest	5.54	0.00866	49.1%	30	166.2
A	Gravel	0.519	0.00081	4.6%	76	39.5
A	Impervious	1.51	0.00236	13.4%	98	148.0
A	Open	1.11	0.00174	9.9%	39	43.4
B	Forest	1.44	0.00225	12.8%	55	79.3
B	Gravel	0.392	0.00061	3.5%	85	33.3
B	Impervious	0.262	0.00041	2.3%	98	25.6
C	Forest	0.325	0.00051	2.9%	70	22.8
C	Gravel	0.131	0.00020	1.2%	89	11.6
C	Impervious	0.0575	0.00009	0.5%	98	5.6
		11.29	0.01764	100.0%		575.25

Weighted Curve Number: 51.0
Total Impervious Area: 2.87 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	33.3%	1	1.47	0.0283
1200	Shallow Conc. Flow	11.7%	4	3.83	0.0871
2350	Small Tributary	3.0%	5	3.41	0.192
3700	Total Distance Traveled				
				Sum Tt:	0.307

Tc, Time of Concentration: 0.307
18.4

Pioneer Environmental Associates LLC.
Project: **Sugarbush Lincoln Peak Development**
Date: **3/6/03**
Phase: **Post Development**

Subwatershed: R3

Area (sqmi): 0.183
Area (acres): 117

1. RUNOFF CURVE NUMBER CALCULATION

Hydrologic Soil Group	Cover Description	Area (acres)	Area (sq mi)	(%)	Curve Number	Area * CN
A	Brush	3.80	0.00593	3.2%	30	113.9
A	Forest	39.8	0.0622	34.0%	30	1194.2
A	Gravel	3.42	0.00534	2.9%	76	259.8
A	Impervious	4.23	0.00662	3.6%	98	415.0
A	Open	1.02	0.00159	0.9%	39	39.7
B	Brush	0.0121	0.00002	0.0%	48	0.6
B	Forest	9.86	0.0154	8.4%	55	542.1
B	Gravel	1.58	0.00247	1.3%	85	134.2
B	Impervious	2.16	0.00337	1.8%	98	211.3
B	Open	0.380	0.00059	0.3%	61	23.2
C	Forest	40.2	0.0629	34.4%	70	2816.1
C	Gravel	3.76	0.00588	3.2%	89	334.9
C	Impervious	1.75	0.00274	1.5%	98	171.7
C	Open	3.75	0.00586	3.2%	74	277.7
	Water	1.24	0.00194	1.1%	100	124.2
		117	0.1828	100.0%		6658.50

Weighted Curve Number: 56.9
Total Impervious Area: 16.9 acres

2. TIME OF CONCENTRATION CALCULATION

Distance (ft)	Cover Type	% Slope	Code	Equation Velocity (ft/sec)	Travel Time (hrs)
150	Overland	20.0%	1	1.13	0.0369
4400	Shallow Conc. Flow	25.0%	4	5.52	0.222
825	Small Tributary	15.8%	5	7.57	0.0303
575	Culvert	8.7%	3	5.77	0.0277
2650	Small Tributary	7.2%	5	5.19	0.142
8600	Total Distance Traveled				
				Sum Tt:	0.458

Tc, Time of Concentration: 0.458
27.5

```
******************80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY******************

JOB TR-20                                                SUMMARY   NOPLOTS
TITLE 001 SUGARBUSH LP DEVELOPMENT        PREDEVELOPMENT CONDITIONS
TITLE     3/5/03  F:\PROJECT\02085\SUGARBUSH LP DEVELOPMENT\TR20\SBPRED.INP
 2 XSECTN   001          1.0          1594.0
 8                         1590.0       0.0          0.0
 8                         1590.5       19.91        3.532
 8                         1591.0       65.46        8.835
 8                         1591.5       119.85       14.519
 8                         1592.0       252.13       23.924
 8                         1592.5       480.73       36.494
 8                         1593.0       734.41       48.6
 8                         1594.0       1338.55      73.8
 9 ENDTBL
 2 XSECTN   002          1.0          1519.0
 8                         1515.0       0.0          0.0
 8                         1515.5       17.76        2.5
 8                         1516.0       42.08        6.424
 8                         1516.5       107.04       13.487
 8                         1517.0       198.43       22.12
 8                         1517.5       382.32       36.044
 8                         1518.0       631.84       51.943
 8                         1519.0       1319.56      89.62
 9 ENDTBL
 2 XSECTN   003          1.0          1419.0
 8                         1415.0       0.0          0.0
 8                         1415.5       17.76        2.5
 8                         1416.0       42.08        6.424
 8                         1416.5       107.04       13.487
 8                         1417.0       198.43       22.12
 8                         1417.5       382.32       36.044
 8                         1418.0       631.84       51.943
 8                         1419.0       1319.56      89.62
 9 ENDTBL
 2 XSECTN   004          1.0          1552.0
 8                         1550.0       0.0          0.0
 8                         1550.5       12.0         3.5
 8                         1551.0       40.0         7.07
 8                         1551.5       68.0         7.071
 8                         1552.0       100.0        7.072
 9 ENDTBL
 2 XSECTN   005          1.0          1512.5
 8                         1510.0        0.0          0.0
 8                         1510.5        12.65        2.0
 8                         1511.0        48.00        5.35
 8                         1511.5        82.98        8.11
 8                         1512.0        156.48       12.63
 8                         1512.5        190.18       15.72
 9 ENDTBL
 2 XSECTN   006          1.0          1472.5
 8                         1470.0       0.0          0.0
 8                         1470.5       14.36        2.55
 8                         1471.0       72.36        8.241
 8                         1471.5       176.28       16.075
 8                         1472.0       347.19       26.684
 8                         1472.5       607.78       38.848
 9 ENDTBL
 2 XSECTN   007          1.0          1454.5
 8                         1452.0       0.0          0.0
 8                         1452.5       14.36        2.55
 8                         1453.0       72.36        8.241
 8                         1453.5       176.28       16.075
 8                         1454.0       347.19       26.684
 8                         1454.5       607.78       38.848
 9 ENDTBL
 2 XSECTN   008          1.0          1542.5
 8                         1540.0       0.0          0.0
 8                         1540.5       42.7         5.8
 8                         1541.0       122.5        11.4
 8                         1541.5       225.6        17.3
 8                         1542.0       339.0        23.0
 8                         1542.5       455.4        31.6
 9 ENDTBL
 3 STRUCT      99
 9 ENDTBL
 6 RUNOFF 1 001        1 1.66114      70.8         0.4699                  C1
 6 REACH  3 001   1    2 1400.0
 6 RUNOFF 1 002        3 0.02437      33.0         0.1898                  C2A
 6 RUNOFF 1 002        4 0.07815      70.7         0.2309                  C2
 6 ADDHYD 4 002   3 4 1
 6 ADDHYD 4 002   1 2 3
 6 REACH  3 002   3    1 1350.0
 6 RUNOFF 1 003        2 0.00472      46.0         0.1023                  C3A
 6 RUNOFF 1 003        4 0.03344      31.5         0.1354                  C3
 6 ADDHYD 4 003   2 4 3
 6 ADDHYD 4 003   3 1 2
```

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**********80-80 LIST OF INPUT DATA (CONTINUED)**********
  6 REACH   3 003    2    1 2100.0
  6 RUNOFF  1 004         2 0.08837      57.9         0.2140                  H1
  6 RUNOFF  1 004         3 0.0550       46.5         0.2546                  P1
  6 RUNOFF  1 004         4 0.00150      30.0         0.0955                  H2
  6 ADDHYD  4 004    2 3 5
  6 ADDHYD  4 004    5 4 3
  6 REACH   3 004    3    2 450.0
  6 RUNOFF  1 005         4 0.01401      30.0         0.1374                  H3
  6 ADDHYD  4 005    2 4 3
  6 REACH   3 005    3    2 1050.0
  6 RUNOFF  1 006         5 0.00430      31.8         0.0988                  H5
  6 RUNOFF  1 006         4 0.00629      30.0         0.0909                  H4
  6 ADDHYD  4 006    4 5 3
  6 ADDHYD  4 006    3 2 7
  6 REACH   3 006    7    2 300.0
  6 RUNOFF  1 008         4 0.46625      69.8         0.3313                  R1
  6 REACH   3 008    4    3 1275.0
  6 RUNOFF  1 007         4 0.00582      30.0         0.1437                  R2A
  6 RUNOFF  1 007         6 0.01764      48.6         0.3070                  R2
  6 ADDHYD  4 007    2 4 5
  6 ADDHYD  4 007    5 6 4
  6 ADDHYD  4 007    4 3 5
  6 REACH   3 007    5    2 2200.0
  6 RUNOFF  1     99      3 0.4041       60.4         0.3677                  C4
  6 RUNOFF  1     99      4 0.18281      56.7         0.4586                  R3
  6 ADDHYD  4     99 3 4 5
  6 ADDHYD  4     99 1 2 6
  6 ADDHYD  4     99 5 6 7
    ENDATA
  7 INCREM  6             0.10
  7 BASFLO  5             0.10
  7 COMPUT  7 001      99                2.20         1.0     2 2  01  01 1 YEAR
    ENDCMP  1
  7 COMPUT  7 001      99                2.40         1.0     2 2  01  02 2 YEAR
    ENDCMP  1
  7 COMPUT  7 001      99                3.40         1.0     2 2  01  03 10 YEAR
    ENDCMP  1
  7 COMPUT  7 001      99                5.40         1.0     2 2  01  04 100 YEAR
    ENDCMP  1
    ENDJOB  2
0*******************************END OF 80-80 LIST*********************************
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SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 1													
XSECTION 1	RUNOFF	1.66	2	2	.10	.0	2.20	24.00	.34	---	12.25	224.31	135.0
XSECTION 1	REACH	1.66	2	2	.10	.0	2.20	24.00	.34	1591.90	12.25	224.41	135.1
XSECTION 2	RUNOFF	.02	2	2	.10	.0	2.20	24.00	.00	---	.00	.00	.0
XSECTION 2	RUNOFF	.08	2	2	.10	.0	2.20	24.00	.34	---	12.09	16.25	207.9
XSECTION 2	ADDHYD	.10	2	2	.10	.0	2.20	24.00	.26	1515.46	12.09	16.25	158.5
XSECTION 2	ADDHYD	1.76	2	2	.10	.0	2.20	24.00	.34	1517.09	12.24	233.22	132.2
XSECTION 2	REACH	1.76	2	2	.10	.0	2.20	24.00	.34	1517.09	12.24	233.22	132.2
XSECTION 3	RUNOFF	.00	2	2	.10	.0	2.20	24.00	.00	---	.00	.00	.0
XSECTION 3	RUNOFF	.03	2	2	.10	.0	2.20	24.00	.00	---	.00	.00	.0
XSECTION 3	ADDHYD	.04	2	2	.10	.0	2.20	24.00	.00	---	.00	.00	.0
XSECTION 3	ADDHYD	1.80	2	2	.10	.0	2.20	24.00	.33	1417.09	12.24	233.22	129.4
XSECTION 3	REACH	1.80	2	2	.10	.0	2.20	24.00	.33	1417.09	12.34	232.49	129.0
XSECTION 4	RUNOFF	.09	2	2	.10	.0	2.20	24.00	.07	---	12.80	.58	6.5
XSECTION 4	RUNOFF	.05	2	2	.10	.0	2.20	24.00	.00	---	.00	.00	.0
XSECTION 4	RUNOFF	.00	2	2	.10	.0	2.20	24.00	.00	---	.00	.00	.0
XSECTION 4	ADDHYD	.14	2	2	.10	.0	2.20	24.00	.04	1550.02	12.80	.58	4.0
XSECTION 4	ADDHYD	.14	2	2	.10	.0	2.20	24.00	.04	1550.02	12.80	.58	4.0
XSECTION 4	REACH	.14	2	2	.10	.0	2.20	24.00	.04	1550.02	12.90	.57	3.9
XSECTION 5	RUNOFF	.01	2	2	.10	.0	2.20	24.00	.00	---	.00	.00	.0
XSECTION 5	ADDHYD	.16	2	2	.10	.0	2.20	24.00	.04	1510.02	12.90	.57	3.6
XSECTION 5	REACH	.16	2	2	.10	.0	2.20	24.00	.04	1510.02	13.10	.56	3.5
XSECTION 6	RUNOFF	.00	2	2	.10	.0	2.20	24.00	.00	---	.00	.00	.0
XSECTION 6	RUNOFF	.01	2	2	.10	.0	2.20	24.00	.00	---	.00	.00	.0
XSECTION 6	ADDHYD	.01	2	2	.10	.0	2.20	24.00	.00	---	.00	.00	.0
XSECTION 6	ADDHYD	.17	2	2	.10	.0	2.20	24.00	.04	1470.02	13.10	.56	3.3
XSECTION 6	REACH	.17	2	2	.10	.0	2.20	24.00	.04	1470.02	13.10	.56	3.3
XSECTION 8	RUNOFF	.47	2	2	.10	.0	2.20	24.00	.31	---	12.15	67.21	144.1
XSECTION 8	REACH	.47	2	2	.10	.0	2.20	24.00	.31	1540.65	12.15	67.21	144.1
XSECTION 7	RUNOFF	.01	2	2	.10	.0	2.20	24.00	.00	---	.00	.00	.0
XSECTION 7	RUNOFF	.02	2	2	.10	.0	2.20	24.00	.00	---	.00	.00	.0
XSECTION 7	ADDHYD	.18	2	2	.10	.0	2.20	24.00	.03	1452.02	13.10	.56	3.2
XSECTION 7	ADDHYD	.19	2	2	.10	.0	2.20	24.00	.03	1452.02	13.10	.56	2.9
XSECTION 7	ADDHYD	.66	2	2	.10	.0	2.20	24.00	.23	1452.96	12.15	67.21	102.0
XSECTION 7	REACH	.66	2	2	.10	.0	2.20	24.00	.23	1452.95	12.26	66.96	101.6
STRUCTURE 99	RUNOFF	.40	2	2	.10	.0	2.20	24.00	.11	---	12.42	5.51	13.6
STRUCTURE 99	RUNOFF	.18	2	2	.10	.0	2.20	24.00	.05	---	13.60	.76	4.2
STRUCTURE 99	ADDHYD	.59	2	2	.10	.0	2.20	24.00	.09	---	12.50	5.57	9.5
STRUCTURE 99	ADDHYD	2.46	2	2	.10	.0	2.20	24.00	.30	---	12.32	294.71	119.8
STRUCTURE 99	ADDHYD	3.05	2	2	.10	.0	2.20	24.00	.26	---	12.32	300.16	98.5

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

ALTERNATE 1 STORM 2

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
XSECTION 1	RUNOFF	1.66	2	2	.10	.0	2.40	24.00	.43	---	12.24	307.24	185.0
XSECTION 1	REACH	1.66	2	2	.10	.0	2.40	24.00	.43	1592.12	12.24	307.24	185.0
XSECTION 2	RUNOFF	.02	2	2	.10	.0	2.40	24.00	.00	---	.00	.00	.0
XSECTION 2	RUNOFF	.08	2	2	.10	.0	2.40	24.00	.43	---	12.09	21.89	280.1
XSECTION 2	ADDHYD	.10	2	2	.10	.0	2.40	24.00	.33	1515.58	12.09	21.89	213.5
XSECTION 2	ADDHYD	1.76	2	2	.10	.0	2.40	24.00	.43	1517.33	12.23	319.24	181.0
XSECTION 2	REACH	1.76	2	2	.10	.0	2.40	24.00	.43	1517.33	12.23	319.24	181.0
XSECTION 3	RUNOFF	.00	2	2	.10	.0	2.40	24.00	.00	---	.00	.00	.0
XSECTION 3	RUNOFF	.03	2	2	.10	.0	2.40	24.00	.00	---	.00	.00	.0
XSECTION 3	ADDHYD	.04	2	2	.10	.0	2.40	24.00	.00	---	.00	.00	.0
XSECTION 3	ADDHYD	1.80	2	2	.10	.0	2.40	24.00	.42	1417.33	12.23	319.24	177.2
XSECTION 3	REACH	1.80	2	2	.10	.0	2.40	24.00	.42	1417.33	12.23	319.24	177.2
XSECTION 4	RUNOFF	.09	2	2	.10	.0	2.40	24.00	.11	---	12.30	1.26	14.2
XSECTION 4	RUNOFF	.05	2	2	.10	.0	2.40	24.00	.00	---	23.80?	.02?	.3
XSECTION 4	RUNOFF	.00	2	2	.10	.0	2.40	24.00	.00	---	.00?	.00?	.0
XSECTION 4	ADDHYD	.14	2	2	.10	.0	2.40	24.00	.07	1550.05	12.30	1.26	8.8
XSECTION 4	ADDHYD	.14	2	2	.10	.0	2.40	24.00	.07	1550.05	12.30	1.26	8.7
XSECTION 4	REACH	.14	2	2	.10	.0	2.40	24.00	.07	1550.05	12.40	1.25	8.7
XSECTION 5	RUNOFF	.01	2	2	.10	.0	2.40	24.00	.00	---	.00	.00	.0
XSECTION 5	ADDHYD	.16	2	2	.10	.0	2.40	24.00	.06	1510.05	12.40	1.25	7.9
XSECTION 5	REACH	.16	2	2	.10	.0	2.40	24.00	.06	1510.05	12.50	1.24	7.8
XSECTION 6	RUNOFF	.00	2	2	.10	.0	2.40	24.00	.00	---	.00	.00	.0
XSECTION 6	RUNOFF	.01	2	2	.10	.0	2.40	24.00	.00	---	.00	.00	.0
XSECTION 6	ADDHYD	.01	2	2	.10	.0	2.40	24.00	.00	---	.00	.00	.0
XSECTION 6	ADDHYD	.17	2	2	.10	.0	2.40	24.00	.06	1470.04	12.50	1.24	7.3
XSECTION 6	REACH	.17	2	2	.10	.0	2.40	24.00	.06	1470.04	12.50	1.24	7.3
XSECTION 8	RUNOFF	.47	2	2	.10	.0	2.40	24.00	.40	---	12.14	96.49	207.0
XSECTION 8	REACH	.47	2	2	.10	.0	2.40	24.00	.40	1540.84	12.14	96.49	207.0
XSECTION 7	RUNOFF	.01	2	2	.10	.0	2.40	24.00	.00	---	.00	.00	.0
XSECTION 7	RUNOFF	.02	2	2	.10	.0	2.40	24.00	.01	---	23.80?	.02?	.9
XSECTION 7	ADDHYD	.18	2	2	.10	.0	2.40	24.00	.06	1452.04	12.50	1.24	7.1
XSECTION 7	ADDHYD	.19	2	2	.10	.0	2.40	24.00	.05	1452.04	12.50	1.24	6.4
XSECTION 7	ADDHYD	.66	2	2	.10	.0	2.40	24.00	.30	1453.12	12.14	96.52	146.4
XSECTION 7	REACH	.66	2	2	.10	.0	2.40	24.00	.30	1453.12	12.14	96.52	146.4
STRUCTURE 99	RUNOFF	.40	2	2	.10	.0	2.40	24.00	.15	---	12.28	12.49	30.9
STRUCTURE 99	RUNOFF	.18	2	2	.10	.0	2.40	24.00	.09	---	12.90	1.64	9.0
STRUCTURE 99	ADDHYD	.59	2	2	.10	.0	2.40	24.00	.13	---	12.30	13.19	22.5
STRUCTURE 99	ADDHYD	2.46	2	2	.10	.0	2.40	24.00	.39	---	12.21	406.13	165.0
STRUCTURE 99	ADDHYD	3.05	2	2	.10	.0	2.40	24.00	.34	---	12.21	418.60	137.3

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 3													
XSECTION 1	RUNOFF	1.66	2	2	.10	.0	3.40	24.00	.99	---	12.21	826.95	497.8
XSECTION 1	REACH	1.66	2	2	.10	.0	3.40	24.00	.99	1593.15	12.21	826.95	497.8
XSECTION 2	RUNOFF	.02	2	2	.10	.0	3.40	24.00	.00	---	.00	.00	.0
XSECTION 2	RUNOFF	.08	2	2	.10	.0	3.40	24.00	.99	---	12.07	56.03	717.0
XSECTION 2	ADDHYD	.10	2	2	.10	.0	3.40	24.00	.75	1516.11	12.07	56.03	546.5
XSECTION 2	ADDHYD	1.76	2	2	.10	.0	3.40	24.00	.97	1518.33	12.20	859.50	487.3
XSECTION 2	REACH	1.76	2	2	.10	.0	3.40	24.00	.97	1518.33	12.20	859.50	487.3
XSECTION 3	RUNOFF	.00	2	2	.10	.0	3.40	24.00	.09	---	13.00	.03	7.0
XSECTION 3	RUNOFF	.03	2	2	.10	.0	3.40	24.00	.00	---	.00	.00	.0
XSECTION 3	ADDHYD	.04	2	2	.10	.0	3.40	24.00	.01	1415.00	13.00	.03	.9
XSECTION 3	ADDHYD	1.80	2	2	.10	.0	3.40	24.00	.95	1418.33	12.20	859.50	477.0
XSECTION 3	REACH	1.80	2	2	.10	.0	3.40	24.00	.95	1418.33	12.20	859.50	477.0
XSECTION 4	RUNOFF	.09	2	2	.10	.0	3.40	24.00	.41	---	12.10	19.84	224.5
XSECTION 4	RUNOFF	.05	2	2	.10	.0	3.40	24.00	.10	---	13.10	.45	8.2
XSECTION 4	RUNOFF	.00	2	2	.10	.0	3.40	24.00	.00	---	.00	.00	.0
XSECTION 4	ADDHYD	.14	2	2	.10	.0	3.40	24.00	.29	1550.64	12.10	19.84	138.4
XSECTION 4	ADDHYD	.14	2	2	.10	.0	3.40	24.00	.29	1550.64	12.10	19.84	137.0
XSECTION 4	REACH	.14	2	2	.10	.0	3.40	24.00	.29	1550.64	12.10	19.84	137.0
XSECTION 5	RUNOFF	.01	2	2	.10	.0	3.40	24.00	.00	---	.00	.00	.0
XSECTION 5	ADDHYD	.16	2	2	.10	.0	3.40	24.00	.26	1510.60	12.10	19.84	124.9
XSECTION 5	REACH	.16	2	2	.10	.0	3.40	24.00	.26	1510.60	12.10	19.84	124.9
XSECTION 6	RUNOFF	.00	2	2	.10	.0	3.40	24.00	.00	---	.00	.00	.0
XSECTION 6	RUNOFF	.01	2	2	.10	.0	3.40	24.00	.00	---	.00	.00	.0
XSECTION 6	ADDHYD	.01	2	2	.10	.0	3.40	24.00	.00	---	.00	.00	.0
XSECTION 6	ADDHYD	.17	2	2	.10	.0	3.40	24.00	.25	1470.55	12.10	19.84	117.1
XSECTION 6	REACH	.17	2	2	.10	.0	3.40	24.00	.25	1470.55	12.10	19.84	117.1
XSECTION 8	RUNOFF	.47	2	2	.10	.0	3.40	24.00	.94	---	12.12	270.18	579.5
XSECTION 8	REACH	.47	2	2	.10	.0	3.40	24.00	.94	1541.70	12.12	270.18	579.5
XSECTION 7	RUNOFF	.01	2	2	.10	.0	3.40	24.00	.00	---	.00	.00	.0
XSECTION 7	RUNOFF	.02	2	2	.10	.0	3.40	24.00	.14	---	12.80	.27	15.2
XSECTION 7	ADDHYD	.18	2	2	.10	.0	3.40	24.00	.24	1452.55	12.10	19.84	113.2
XSECTION 7	ADDHYD	.19	2	2	.10	.0	3.40	24.00	.23	1452.55	12.10	19.92	103.2
XSECTION 7	ADDHYD	.66	2	2	.10	.0	3.40	24.00	.73	1453.83	12.12	289.83	439.7
XSECTION 7	REACH	.66	2	2	.10	.0	3.40	24.00	.73	1453.83	12.12	289.83	439.7
STRUCTURE 99	RUNOFF	.40	2	2	.10	.0	3.40	24.00	.50	---	12.18	90.63	224.3
STRUCTURE 99	RUNOFF	.18	2	2	.10	.0	3.40	24.00	.37	---	12.28	20.77	113.6
STRUCTURE 99	ADDHYD	.59	2	2	.10	.0	3.40	24.00	.46	---	12.20	109.81	187.1
STRUCTURE 99	ADDHYD	2.46	2	2	.10	.0	3.40	24.00	.89	---	12.17	1116.53	453.7
STRUCTURE 99	ADDHYD	3.05	2	2	.10	.0	3.40	24.00	.81	---	12.18	1225.30	402.0

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 4													
XSECTION 1	RUNOFF	1.66	2	2	.10	.0	5.40	24.00	2.40	---	12.19	2150.80	1294.8
XSECTION 1	REACH	1.66	2	2	.10	.0	5.40	24.00	2.40	1595.34	12.19	2150.80	1294.8
XSECTION 2	RUNOFF	.02	2	2	.10	.0	5.40	24.00	.08	---	16.50	.14	5.8
XSECTION 2	RUNOFF	.08	2	2	.10	.0	5.40	24.00	2.40	---	12.05	141.25	1807.4
XSECTION 2	ADDHYD	.10	2	2	.10	.0	5.40	24.00	1.85	1516.69	12.05	141.25	1377.8
XSECTION 2	ADDHYD	1.76	2	2	.10	.0	5.40	24.00	2.37	1520.33	12.18	2237.59	1268.7
XSECTION 2	REACH	1.76	2	2	.10	.0	5.40	24.00	2.37	1520.33	12.18	2237.59	1268.7
XSECTION 3	RUNOFF	.00	2	2	.10	.0	5.40	24.00	.62	---	12.01	2.10	445.9
XSECTION 3	RUNOFF	.03	2	2	.10	.0	5.40	24.00	.05	---	19.70	.12	3.7
XSECTION 3	ADDHYD	.04	2	2	.10	.0	5.40	24.00	.12	1415.06	12.01	2.10	55.1
XSECTION 3	ADDHYD	1.80	2	2	.10	.0	5.40	24.00	2.32	1420.34	12.18	2238.28	1242.2
XSECTION 3	REACH	1.80	2	2	.10	.0	5.40	24.00	2.32	1420.34	12.18	2238.28	1242.2
XSECTION 4	RUNOFF	.09	2	2	.10	.0	5.40	24.00	1.39	---	12.06	88.91	1006.1
XSECTION 4	RUNOFF	.05	2	2	.10	.0	5.40	24.00	.66	---	12.12	18.11	329.3
XSECTION 4	RUNOFF	.00	2	2	.10	.0	5.40	24.00	.00	---	.00	.00	.0
XSECTION 4	ADDHYD	.14	2	2	.10	.0	5.40	24.00	1.11	1552.09	12.07	105.60	736.6
XSECTION 4	ADDHYD	.14	2	2	.10	.0	5.40	24.00	1.10	1552.09	12.07	105.60	728.9
XSECTION 4	REACH	.14	2	2	.10	.0	5.40	24.00	1.10	1552.09	12.07	105.60	728.9
XSECTION 5	RUNOFF	.01	2	2	.10	.0	5.40	24.00	.02	---	23.70?	.03?	2.4
XSECTION 5	ADDHYD	.16	2	2	.10	.0	5.40	24.00	1.00	1511.65	12.07	105.60	664.7
XSECTION 5	REACH	.16	2	2	.10	.0	5.40	24.00	1.00	1511.65	12.07	105.60	664.7
XSECTION 6	RUNOFF	.00	2	2	.10	.0	5.40	24.00	.05	---	19.70	.02	4.1
XSECTION 6	RUNOFF	.01	2	2	.10	.0	5.40	24.00	.02	---	23.70?	.02?	2.4
XSECTION 6	ADDHYD	.01	2	2	.10	.0	5.40	24.00	.03	1470.00	23.70?	.03?	3.1
XSECTION 6	ADDHYD	.17	2	2	.10	.0	5.40	24.00	.94	1471.16	12.07	105.60	623.1
XSECTION 6	REACH	.17	2	2	.10	.0	5.40	24.00	.94	1471.16	12.07	105.60	623.1
XSECTION 8	RUNOFF	.47	2	2	.10	.0	5.40	24.00	2.32	---	12.11	715.09	1533.7
XSECTION 8	REACH	.47	2	2	.10	.0	5.40	24.00	2.32	1543.62	12.11	715.09	1533.7
XSECTION 7	RUNOFF	.01	2	2	.10	.0	5.40	24.00	.02	---	23.70?	.01?	2.4
XSECTION 7	RUNOFF	.02	2	2	.10	.0	5.40	24.00	.78	---	12.14	6.81	386.2
XSECTION 7	ADDHYD	.18	2	2	.10	.0	5.40	24.00	.91	1453.16	12.07	105.60	602.4
XSECTION 7	ADDHYD	.19	2	2	.10	.0	5.40	24.00	.90	1453.19	12.08	111.78	579.4
XSECTION 7	ADDHYD	.66	2	2	.10	.0	5.40	24.00	1.91	1454.92	12.10	824.95	1251.5
XSECTION 7	REACH	.66	2	2	.10	.0	5.40	24.00	1.91	1454.92	12.10	824.95	1251.5
STRUCTURE 99	RUNOFF	.40	2	2	.10	.0	5.40	24.00	1.57	---	12.14	371.99	920.5
STRUCTURE 99	RUNOFF	.18	2	2	.10	.0	5.40	24.00	1.30	---	12.21	115.18	630.1
STRUCTURE 99	ADDHYD	.59	2	2	.10	.0	5.40	24.00	1.49	---	12.15	474.99	809.3
STRUCTURE 99	ADDHYD	2.46	2	2	.10	.0	5.40	24.00	2.21	---	12.14	3016.79	1225.8
STRUCTURE 99	ADDHYD	3.05	2	2	.10	.0	5.40	24.00	2.07	---	12.15	3497.61	1147.5

```
******************80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY******************

JOB TR-20                                                  SUMMARY   NOPLOTS
TITLE 001 SUGARBUSH LP DEVELOPMENT                        EXISTING CONDITIONS
TITLE     3/5/03  F:\PROJECT\02085\SUGARBUSH LP DEVELOPMENT\TR20\SBCUR.INP
 2 XSECTN   001          1.0          1594.0
 8                        1590.0       0.0          0.0
 8                        1590.5       19.91        3.532
 8                        1591.0       65.46        8.835
 8                        1591.5       119.85       14.519
 8                        1592.0       252.13       23.924
 8                        1592.5       480.73       36.494
 8                        1593.0       734.41       48.6
 8                        1594.0       1338.55      73.8
 9 ENDTBL
 2 XSECTN   002          1.0          1519.0
 8                        1515.0       0.0          0.0
 8                        1515.5       17.76        2.5
 8                        1516.0       42.08        6.424
 8                        1516.5       107.04       13.487
 8                        1517.0       198.43       22.12
 8                        1517.5       382.32       36.044
 8                        1518.0       631.84       51.943
 8                        1519.0       1319.56      89.62
 9 ENDTBL
 2 XSECTN   003          1.0          1419.0
 8                        1415.0       0.0          0.0
 8                        1415.5       17.76        2.5
 8                        1416.0       42.08        6.424
 8                        1416.5       107.04       13.487
 8                        1417.0       198.43       22.12
 8                        1417.5       382.32       36.044
 8                        1418.0       631.84       51.943
 8                        1419.0       1319.56      89.62
 9 ENDTBL
 2 XSECTN   004          1.0          1552.0
 8                        1550.0       0.0          0.0
 8                        1550.5       12.0         3.5
 8                        1551.0       40.0         7.07
 8                        1551.5       68.0         7.071
 8                        1552.0       100.0        7.072
 9 ENDTBL
 2 XSECTN   005          1.0          1512.5
 8                        1510.0        0.0          0.0
 8                        1510.5        12.65        2.0
 8                        1511.0        48.00        5.35
 8                        1511.5        82.98        8.11
 8                        1512.0        156.48       12.63
 8                        1512.5        190.18       15.72
 9 ENDTBL
 2 XSECTN   006          1.0          1472.5
 8                        1470.0       0.0          0.0
 8                        1470.5       14.36        2.55
 8                        1471.0       72.36        8.241
 8                        1471.5       176.28       16.075
 8                        1472.0       347.19       26.684
 8                        1472.5       607.78       38.848
 9 ENDTBL
 2 XSECTN   007          1.0          1454.5
 8                        1452.0       0.0          0.0
 8                        1452.5       14.36        2.55
 8                        1453.0       72.36        8.241
 8                        1453.5       176.28       16.075
 8                        1454.0       347.19       26.684
 8                        1454.5       607.78       38.848
 9 ENDTBL
 2 XSECTN   008          1.0          1542.5
 8                        1540.0       0.0          0.0
 8                        1540.5       42.7         5.8
 8                        1541.0       122.5        11.4
 8                        1541.5       225.6        17.3
 8                        1542.0       339.0        23.0
 8                        1542.5       455.4        31.6
 9 ENDTBL
 3 STRUCT      01
 8                        1534.0         0.0          0.0
 8                        1534.5         0.00         0.031
 8                        1535.0         0.00         0.067
 8                        1535.5         0.00         0.107
 8                        1536.0         0.00         0.152
 8                        1536.5         0.05         0.203
 8                        1537.0         0.07         0.260
 8                        1537.5         0.08         0.323
 8                        1538.0         2.77         0.392
 8                        1538.5         3.89         0.467
 8                        1539.0         4.51         0.548
 8                        1539.5         4.69         0.634
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**********80-80 LIST OF INPUT DATA (CONTINUED)**********
 8                        1540.0        4.87        0.724
 8                        1540.5       11.45        0.821
 8                        1541.0       28.28        0.926
 9 ENDTBL
 3 STRUCT      99
 9 ENDTBL
 6 RUNOFF 1 001         1 1.66114      70.8         0.4699                  C1
 6 REACH  3 001    1    2 1400.0
 6 RUNOFF 1 002         1 0.08192      69.8         0.2302                  C2
 6 ADDHYD 4 002    1 2 3
 6 REACH  3 002    3    2 1350.0
 6 RUNOFF 1 003         1 0.03900      36.4         0.1354                  C3
 6 ADDHYD 4 003    1 2 3
 6 REACH  3 003    3    1 2100.0
 6 RUNOFF 1 004         2 0.07984      60.1         0.2140                  H1
 6 RUNOFF 1 004         3 0.0550       46.5         0.2546                  P1
 6 ADDHYD 4 004    2 3 4
 6 REACH  3 004    4    2 450.0
 6 RUNOFF 1     01      3 0.02957      58.7         0.2062                  P2
 6 RESVOR 2     01 3    4 1536.0
 6 ADDHYD 4 005    2 4 3
 6 REACH  3 005    3    2 1050.0
 6 RUNOFF 1 006         4 0.01905      37.4         0.1831                  H2
 6 ADDHYD 4 006    4 2 3
 6 REACH  3 006    3    2 300.0
 6 RUNOFF 1 008         3 0.46704      69.8         0.3313                  R1
 6 REACH  3 008    3    4 1250.0
 6 RUNOFF 1 007         3 0.01930      46.9         0.3070                  R2
 6 ADDHYD 4 007    3 2 5
 6 ADDHYD 4 007    5 4 3
 6 REACH  3 007    3    2 2200.0
 6 RUNOFF 1     99      3 0.40535      60.5         0.3677                  C4
 6 RUNOFF 1     99      4 0.19069      55.8         0.4582                  R3
 6 ADDHYD 4     99 3 4 5
 6 ADDHYD 4     99 1 2 6
 6 ADDHYD 4     99 5 6 7
   ENDATA
 7 INCREM 6              0.10
 7 BASFLO 5              0.10
 7 COMPUT 7 001      99                2.20         1.0     2 2  01  01 1 YEAR
   ENDCMP 1
 7 COMPUT 7 001      99                2.40         1.0     2 2  01  02 2 YEAR
   ENDCMP 1
 7 COMPUT 7 001      99                3.40         1.0     2 2  01  03 10 YEAR
   ENDCMP 1
 7 COMPUT 7 001      99                5.40         1.0     2 2  01  04 100 YEAR
   ENDCMP 1
   ENDJOB 2
0**********END OF 80-80 LIST**********
```

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 1													
XSECTION 1	RUNOFF	1.66	2	2	.10	.0	2.20	24.00	.34	---	12.25	224.31	135.0
XSECTION 1	REACH	1.66	2	2	.10	.0	2.20	24.00	.34	1591.90	12.25	224.41	135.1
XSECTION 2	RUNOFF	.08	2	2	.10	.0	2.20	24.00	.32	---	12.10	15.11	184.5
XSECTION 2	ADDHYD	1.74	2	2	.10	.0	2.20	24.00	.34	1517.09	12.24	232.72	133.5
XSECTION 2	REACH	1.74	2	2	.10	.0	2.20	24.00	.34	1517.09	12.24	232.72	133.5
XSECTION 3	RUNOFF	.04	2	2	.10	.0	2.20	24.00	.00	---	.00	.00	.0
XSECTION 3	ADDHYD	1.78	2	2	.10	.0	2.20	24.00	.33	1417.09	12.24	232.72	130.6
XSECTION 3	REACH	1.78	2	2	.10	.0	2.20	24.00	.33	1417.09	12.34	231.98	130.2
XSECTION 4	RUNOFF	.08	2	2	.10	.0	2.20	24.00	.10	---	12.30	1.08	13.5
XSECTION 4	RUNOFF	.05	2	2	.10	.0	2.20	24.00	.00	---	.00	.00	.0
XSECTION 4	ADDHYD	.13	2	2	.10	.0	2.20	24.00	.06	1550.05	12.30	1.08	8.0
XSECTION 4	REACH	.13	2	2	.10	.0	2.20	24.00	.06	1550.04	12.40	1.08	8.0
STRUCTURE 1	RUNOFF	.03	2	2	.10	.0	2.20	24.00	.08	---	12.80	.25	8.4
STRUCTURE 1	RESVOR	.03	2	2	.10	.0	2.20	24.00	.05	1536.75	24.00?	.06?	2.0
XSECTION 5	ADDHYD	.16	2	2	.10	.0	2.20	24.00	.06	1510.04	12.40	1.08	6.5
XSECTION 5	REACH	.16	2	2	.10	.0	2.20	24.00	.06	1510.04	12.50	1.06	6.5
XSECTION 6	RUNOFF	.02	2	2	.10	.0	2.20	24.00	.00	---	.00	.00	.0
XSECTION 6	ADDHYD	.18	2	2	.10	.0	2.20	24.00	.05	1470.04	12.50	1.06	5.8
XSECTION 6	REACH	.18	2	2	.10	.0	2.20	24.00	.05	1470.04	12.50	1.06	5.8
XSECTION 8	RUNOFF	.47	2	2	.10	.0	2.20	24.00	.31	---	12.15	67.32	144.1
XSECTION 8	REACH	.47	2	2	.10	.0	2.20	24.00	.31	1540.65	12.15	67.32	144.1
XSECTION 7	RUNOFF	.02	2	2	.10	.0	2.20	24.00	.00	---	.00	.00	.0
XSECTION 7	ADDHYD	.20	2	2	.10	.0	2.20	24.00	.05	1452.04	12.50	1.06	5.2
XSECTION 7	ADDHYD	.67	2	2	.10	.0	2.20	24.00	.23	1452.96	12.15	67.30	100.5
XSECTION 7	REACH	.67	2	2	.10	.0	2.20	24.00	.23	1452.95	12.26	67.06	100.1
STRUCTURE 99	RUNOFF	.41	2	2	.10	.0	2.20	24.00	.11	---	12.41	5.73	14.1
STRUCTURE 99	RUNOFF	.19	2	2	.10	.0	2.20	24.00	.04	---	14.10	.57	3.0
STRUCTURE 99	ADDHYD	.60	2	2	.10	.0	2.20	24.00	.09	---	12.41	5.73	9.6
STRUCTURE 99	ADDHYD	2.45	2	2	.10	.0	2.20	24.00	.31	---	12.32	294.40	120.1
STRUCTURE 99	ADDHYD	3.05	2	2	.10	.0	2.20	24.00	.26	---	12.32	300.09	98.5

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID		STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 2														
XSECTION	1	RUNOFF	1.66	2	2	.10	.0	2.40	24.00	.43	---	12.24	307.24	185.0
XSECTION	1	REACH	1.66	2	2	.10	.0	2.40	24.00	.43	1592.12	12.24	307.24	185.0
XSECTION	2	RUNOFF	.08	2	2	.10	.0	2.40	24.00	.40	---	12.09	20.75	253.3
XSECTION	2	ADDHYD	1.74	2	2	.10	.0	2.40	24.00	.43	1517.33	12.23	318.71	182.8
XSECTION	2	REACH	1.74	2	2	.10	.0	2.40	24.00	.43	1517.33	12.23	318.71	182.8
XSECTION	3	RUNOFF	.04	2	2	.10	.0	2.40	24.00	.00	---	.00	.00	.0
XSECTION	3	ADDHYD	1.78	2	2	.10	.0	2.40	24.00	.42	1417.33	12.23	318.71	178.8
XSECTION	3	REACH	1.78	2	2	.10	.0	2.40	24.00	.42	1417.33	12.23	318.71	178.8
XSECTION	4	RUNOFF	.08	2	2	.10	.0	2.40	24.00	.15	---	12.13	3.11	39.0
XSECTION	4	RUNOFF	.05	2	2	.10	.0	2.40	24.00	.00	---	23.80?	.02?	.3
XSECTION	4	ADDHYD	.13	2	2	.10	.0	2.40	24.00	.09	1550.13	12.13	3.11	23.1
XSECTION	4	REACH	.13	2	2	.10	.0	2.40	24.00	.09	1550.13	12.13	3.11	23.1
STRUCTURE	1	RUNOFF	.03	2	2	.10	.0	2.40	24.00	.12	---	12.10	.58	19.5
STRUCTURE	1	RESVOR	.03	2	2	.10	.0	2.40	24.00	.06	1537.18	24.10?	.07?	2.5
XSECTION	5	ADDHYD	.16	2	2	.10	.0	2.40	24.00	.08	1510.12	12.13	3.11	18.9
XSECTION	5	REACH	.16	2	2	.10	.0	2.40	24.00	.08	1510.12	12.13	3.11	18.9
XSECTION	6	RUNOFF	.02	2	2	.10	.0	2.40	24.00	.00	---	.00	.00	.0
XSECTION	6	ADDHYD	.18	2	2	.10	.0	2.40	24.00	.08	1470.11	12.13	3.11	17.0
XSECTION	6	REACH	.18	2	2	.10	.0	2.40	24.00	.08	1470.11	12.13	3.11	17.0
XSECTION	8	RUNOFF	.47	2	2	.10	.0	2.40	24.00	.40	---	12.14	96.66	207.0
XSECTION	8	REACH	.47	2	2	.10	.0	2.40	24.00	.40	1540.84	12.14	96.66	207.0
XSECTION	7	RUNOFF	.02	2	2	.10	.0	2.40	24.00	.00	---	23.80?	.01?	.4
XSECTION	7	ADDHYD	.20	2	2	.10	.0	2.40	24.00	.07	1452.11	12.13	3.11	15.4
XSECTION	7	ADDHYD	.67	2	2	.10	.0	2.40	24.00	.30	1453.13	12.14	99.76	148.9
XSECTION	7	REACH	.67	2	2	.10	.0	2.40	24.00	.30	1453.13	12.14	99.76	148.9
STRUCTURE	99	RUNOFF	.41	2	2	.10	.0	2.40	24.00	.16	---	12.28	12.91	31.8
STRUCTURE	99	RUNOFF	.19	2	2	.10	.0	2.40	24.00	.08	---	13.10	1.31	6.9
STRUCTURE	99	ADDHYD	.60	2	2	.10	.0	2.40	24.00	.13	---	12.29	13.15	22.1
STRUCTURE	99	ADDHYD	2.45	2	2	.10	.0	2.40	24.00	.39	---	12.21	408.08	166.4
STRUCTURE	99	ADDHYD	3.05	2	2	.10	.0	2.40	24.00	.34	---	12.21	420.71	138.0

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 3													
XSECTION 1	RUNOFF	1.66	2	2	.10	.0	3.40	24.00	.99	---	12.21	826.95	497.8
XSECTION 1	REACH	1.66	2	2	.10	.0	3.40	24.00	.99	1593.15	12.21	826.95	497.8
XSECTION 2	RUNOFF	.08	2	2	.10	.0	3.40	24.00	.94	---	12.07	55.48	677.2
XSECTION 2	ADDHYD	1.74	2	2	.10	.0	3.40	24.00	.99	1518.33	12.20	859.14	492.9
XSECTION 2	REACH	1.74	2	2	.10	.0	3.40	24.00	.99	1518.33	12.20	859.14	492.9
XSECTION 3	RUNOFF	.04	2	2	.10	.0	3.40	24.00	.00	---	.00	.00	.0
XSECTION 3	ADDHYD	1.78	2	2	.10	.0	3.40	24.00	.96	1418.33	12.20	859.14	482.1
XSECTION 3	REACH	1.78	2	2	.10	.0	3.40	24.00	.96	1418.33	12.20	859.14	482.1
XSECTION 4	RUNOFF	.08	2	2	.10	.0	3.40	24.00	.49	---	12.09	23.78	297.8
XSECTION 4	RUNOFF	.05	2	2	.10	.0	3.40	24.00	.10	---	13.10	.45	8.2
XSECTION 4	ADDHYD	.13	2	2	.10	.0	3.40	24.00	.33	1550.71	12.09	23.78	176.3
XSECTION 4	REACH	.13	2	2	.10	.0	3.40	24.00	.33	1550.71	12.09	23.78	176.3
STRUCTURE 1	RUNOFF	.03	2	2	.10	.0	3.40	24.00	.44	---	12.09	7.48	252.8
STRUCTURE 1	RESVOR	.03	2	2	.10	.0	3.40	24.00	.35	1537.75	12.90	1.44	48.6
XSECTION 5	ADDHYD	.16	2	2	.10	.0	3.40	24.00	.34	1510.66	12.09	23.84	145.0
XSECTION 5	REACH	.16	2	2	.10	.0	3.40	24.00	.34	1510.66	12.09	23.84	145.0
XSECTION 6	RUNOFF	.02	2	2	.10	.0	3.40	24.00	.00	---	.00	.00	.0
XSECTION 6	ADDHYD	.18	2	2	.10	.0	3.40	24.00	.30	1470.58	12.09	23.84	129.9
XSECTION 6	REACH	.18	2	2	.10	.0	3.40	24.00	.30	1470.58	12.09	23.84	129.9
XSECTION 8	RUNOFF	.47	2	2	.10	.0	3.40	24.00	.94	---	12.12	270.64	579.5
XSECTION 8	REACH	.47	2	2	.10	.0	3.40	24.00	.94	1541.70	12.12	270.64	579.5
XSECTION 7	RUNOFF	.02	2	2	.10	.0	3.40	24.00	.10	---	12.90	.18	9.2
XSECTION 7	ADDHYD	.20	2	2	.10	.0	3.40	24.00	.28	1452.58	12.09	23.84	117.6
XSECTION 7	ADDHYD	.67	2	2	.10	.0	3.40	24.00	.74	1453.84	12.12	293.86	438.7
XSECTION 7	REACH	.67	2	2	.10	.0	3.40	24.00	.74	1453.84	12.12	293.86	438.7
STRUCTURE 99	RUNOFF	.41	2	2	.10	.0	3.40	24.00	.51	---	12.18	92.02	227.0
STRUCTURE 99	RUNOFF	.19	2	2	.10	.0	3.40	24.00	.34	---	12.29	18.53	97.2
STRUCTURE 99	ADDHYD	.60	2	2	.10	.0	3.40	24.00	.45	---	12.20	108.76	182.5
STRUCTURE 99	ADDHYD	2.45	2	2	.10	.0	3.40	24.00	.90	---	12.17	1118.81	456.3
STRUCTURE 99	ADDHYD	3.05	2	2	.10	.0	3.40	24.00	.82	---	12.17	1226.53	402.4

TR20 XEQ SUGARBUSH LP DEVELOPMENT EXISTING CONDITIONS JOB 1 SUMMARY
REV PC 09/83(.2) 3/5/03 F:\PROJECT\02085\SUGARBUSH LP DEVELOPMENT\TR20\SBCUR.INP PAGE 13

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 4													
XSECTION 1	RUNOFF	1.66	2	2	.10	.0	5.40	24.00	2.40	---	12.19	2150.80	1294.8
XSECTION 1	REACH	1.66	2	2	.10	.0	5.40	24.00	2.40	1595.34	12.19	2150.80	1294.8
XSECTION 2	RUNOFF	.08	2	2	.10	.0	5.40	24.00	2.33	---	12.05	143.45	1751.1
XSECTION 2	ADDHYD	1.74	2	2	.10	.0	5.40	24.00	2.40	1520.34	12.18	2238.62	1284.3
XSECTION 2	REACH	1.74	2	2	.10	.0	5.40	24.00	2.40	1520.34	12.18	2238.62	1284.3
XSECTION 3	RUNOFF	.04	2	2	.10	.0	5.40	24.00	.19	---	12.80	.75	19.3
XSECTION 3	ADDHYD	1.78	2	2	.10	.0	5.40	24.00	2.35	1420.34	12.18	2239.04	1256.4
XSECTION 3	REACH	1.78	2	2	.10	.0	5.40	24.00	2.35	1420.34	12.18	2239.04	1256.4
XSECTION 4	RUNOFF	.08	2	2	.10	.0	5.40	24.00	1.55	---	12.06	91.22	1142.5
XSECTION 4	RUNOFF	.05	2	2	.10	.0	5.40	24.00	.66	---	12.12	18.11	329.3
XSECTION 4	ADDHYD	.13	2	2	.10	.0	5.40	24.00	1.19	1552.12	12.07	107.68	798.6
XSECTION 4	REACH	.13	2	2	.10	.0	5.40	24.00	1.19	1552.12	12.07	107.68	798.6
STRUCTURE 1	RUNOFF	.03	2	2	.10	.0	5.40	24.00	1.45	---	12.05	31.41	1062.2
STRUCTURE 1	RESVOR	.03	2	2	.10	.0	5.40	24.00	1.35	1540.50	12.30	11.61	392.5
XSECTION 5	ADDHYD	.16	2	2	.10	.0	5.40	24.00	1.22	1511.70	12.07	111.74	679.7
XSECTION 5	REACH	.16	2	2	.10	.0	5.40	24.00	1.22	1511.70	12.07	111.74	679.7
XSECTION 6	RUNOFF	.02	2	2	.10	.0	5.40	24.00	.22	---	12.30	.51	26.5
XSECTION 6	ADDHYD	.18	2	2	.10	.0	5.40	24.00	1.11	1471.19	12.07	112.03	610.7
XSECTION 6	REACH	.18	2	2	.10	.0	5.40	24.00	1.11	1471.19	12.07	112.03	610.7
XSECTION 8	RUNOFF	.47	2	2	.10	.0	5.40	24.00	2.32	---	12.11	716.30	1533.7
XSECTION 8	REACH	.47	2	2	.10	.0	5.40	24.00	2.32	1543.62	12.11	716.30	1533.7
XSECTION 7	RUNOFF	.02	2	2	.10	.0	5.40	24.00	.68	---	12.15	5.95	308.2
XSECTION 7	ADDHYD	.20	2	2	.10	.0	5.40	24.00	1.07	1453.22	12.08	117.28	578.4
XSECTION 7	ADDHYD	.67	2	2	.10	.0	5.40	24.00	1.94	1454.93	12.10	831.97	1242.1
XSECTION 7	REACH	.67	2	2	.10	.0	5.40	24.00	1.94	1454.93	12.10	831.97	1242.1
STRUCTURE 99	RUNOFF	.41	2	2	.10	.0	5.40	24.00	1.58	---	12.14	375.31	925.9
STRUCTURE 99	RUNOFF	.19	2	2	.10	.0	5.40	24.00	1.24	---	12.21	112.54	590.2
STRUCTURE 99	ADDHYD	.60	2	2	.10	.0	5.40	24.00	1.47	---	12.15	475.04	797.0
STRUCTURE 99	ADDHYD	2.45	2	2	.10	.0	5.40	24.00	2.24	---	12.14	3026.23	1234.3
STRUCTURE 99	ADDHYD	3.05	2	2	.10	.0	5.40	24.00	2.09	---	12.15	3506.98	1150.6

```
******************80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY******************

JOB TR-20                                                    SUMMARY   NOPLOTS
TITLE 001 SUGARBUSH LP DEVELOPMENT       POSTDEVELOPMENT CONDITIONS
TITLE     F:\PROJECT\02085\SUGARBUSH LP DEVELOPMENT\TR20\SBPST.INP
 2 XSECTN   001          1.0          1594.0
 8                         1590.0       0.0          0.0
 8                         1590.5       19.91        3.532
 8                         1591.0       65.46        8.835
 8                         1591.5       119.85       14.519
 8                         1592.0       252.13       23.924
 8                         1592.5       480.73       36.494
 8                         1593.0       734.41       48.6
 8                         1594.0       1338.55      73.8
 9 ENDTBL
 2 XSECTN   002          1.0          1519.0
 8                         1515.0       0.0          0.0
 8                         1515.5       17.76        2.5
 8                         1516.0       42.08        6.424
 8                         1516.5       107.04       13.487
 8                         1517.0       198.43       22.12
 8                         1517.5       382.32       36.044
 8                         1518.0       631.84       51.943
 8                         1519.0       1319.56      89.62
 9 ENDTBL
 2 XSECTN   003          1.0          1419.0
 8                         1415.0       0.0          0.0
 8                         1415.5       17.76        2.5
 8                         1416.0       42.08        6.424
 8                         1416.5       107.04       13.487
 8                         1417.0       198.43       22.12
 8                         1417.5       382.32       36.044
 8                         1418.0       631.84       51.943
 8                         1419.0       1319.56      89.62
 9 ENDTBL
 2 XSECTN   004          1.0          1552.0
 8                         1550.0       0.0          0.0
 8                         1550.5       12.0         3.5
 8                         1551.0       40.0         7.07
 8                         1551.5       68.0         7.071
 8                         1552.0       100.0        7.072
 9 ENDTBL
 2 XSECTN   005          1.0          1512.5
 8                         1510.0        0.0          0.0
 8                         1510.5        12.65        2.0
 8                         1511.0        48.00        5.35
 8                         1511.5        82.98        8.11
 8                         1512.0        156.48       12.63
 8                         1512.5        190.18       15.72
 9 ENDTBL
 2 XSECTN   006          1.0          1472.5
 8                         1470.0       0.0          0.0
 8                         1470.5       14.36        2.55
 8                         1471.0       72.36        8.241
 8                         1471.5       176.28       16.075
 8                         1472.0       347.19       26.684
 8                         1472.5       607.78       38.848
 9 ENDTBL
 2 XSECTN   007          1.0          1454.5
 8                         1452.0       0.0          0.0
 8                         1452.5       14.36        2.55
 8                         1453.0       72.36        8.241
 8                         1453.5       176.28       16.075
 8                         1454.0       347.19       26.684
 8                         1454.5       607.78       38.848
 9 ENDTBL
 2 XSECTN   008          1.0          1542.5
 8                         1540.0       0.0          0.0
 8                         1540.5       42.7         5.8
 8                         1541.0       122.5        11.4
 8                         1541.5       225.6        17.3
 8                         1542.0       339.0        23.0
 8                         1542.5       455.4        31.6
 9 ENDTBL
 3 STRUCT     01
 8                         1554.0       0.0          0.0
 8                         1555.0       0.0          0.026
 8                         1556.0       0.0          0.064
 8                         1557.0       0.0          0.120
 8                         1558.0       0.0          0.196
 8                         1559.0       0.0          0.298
 8                         1559.5       0.0          0.361
 8                         1560.0       0.02         0.431
 8                         1560.5       0.29         0.508
 8                         1561.0       3.08         0.593
 8                         1561.5       10.69        0.686
```

```
**********80-80 LIST OF INPUT DATA (CONTINUED)**********
  8                    1562.0     28.30       0.786
  8                    1562.5     57.30       0.899
  8                    1563.0     99.38       1.029
  9 ENDTBL
  3 STRUCT      02
  8                    1522.0     0.0         0.0
  8                    1523.0     0.0         0.006
  8                    1524.0     0.0         0.017
  8                    1525.0     0.0         0.034
  8                    1526.0     0.0         0.060
  8                    1527.0     0.0         0.099
  8                    1528.0     0.0         0.153
  8                    1529.0     0.0         0.223
  8                    1529.5     0.0         0.266
  8                    1530.0     0.02        0.314
  8                    1530.5     0.29        0.369
  8                    1531.0     0.41        0.430
  8                    1531.5     3.17        0.496
  8                    1532.0     4.35        0.566
  8                    1532.5     14.02       0.642
  8                    1533.0     35.74       0.722
  8                    1533.5     70.38       0.807
  8                    1534.0     119.36      0.897
  9 ENDTBL
  3 STRUCT      03
  8                    1524.0     0.0         0.0
  8                    1525.0     0.0         0.006
  8                    1526.0     0.0         0.025
  8                    1527.0     0.0         0.065
  8                    1528.0     0.0         0.122
  8                    1529.0     0.0         0.215
  8                    1529.5     0.0         0.269
  8                    1530.0     0.02        0.319
  8                    1530.5     0.03        0.376
  8                    1531.0     0.04        0.440
  8                    1531.5     0.30        0.509
  8                    1532.0     0.42        0.580
  8                    1532.5     0.50        0.656
  8                    1533.0     3.25        0.738
  8                    1533.5     10.84       0.829
  8                    1534.0     27.79       0.931
  8                    1534.5     56.37       1.045
  8                    1535.0     98.32       1.164
  9 ENDTBL
  3 STRUCT      04
  8                    1481.0     0.0         0.0
  8                    1482.0     0.0         0.011
  8                    1483.0     0.0         0.040
  8                    1484.0     0.0         0.080
  8                    1485.0     0.0         0.132
  8                    1485.8     0.0         0.186
  8                    1486.0     0.01        0.201
  8                    1486.5     0.03        0.238
  8                    1487.0     0.03        0.272
  8                    1487.5     0.30        0.314
  8                    1488.0     3.09        0.370
  8                    1488.5     4.28        0.436
  8                    1489.0     5.21        0.511
  8                    1489.5     14.74       0.599
  8                    1490.0     36.38       0.696
  8                    1490.5     70.96       0.803
  8                    1491.0     119.76      0.919
  9 ENDTBL
  3 STRUCT      05
  8                    1454.5     0.0         0.0
  8                    1455.0     0.0         0.0003
  8                    1456.0     0.0         0.006
  8                    1457.0     0.0         0.018
  8                    1458.0     0.0         0.042
  8                    1458.6     0.0         0.063
  8                    1459.0     0.02        0.078
  8                    1459.5     2.70        0.100
  8                    1460.0     12.57       0.126
  8                    1460.5     34.37       0.157
  8                    1461.0     69.05       0.191
  8                    1461.5     118.03      0.230
  9 ENDTBL
  3 STRUCT      06
  8                    1543.0     0.0         0.0
  8                    1543.5     0.04        0.004
  8                    1544.0     0.06        0.009
  8                    1544.5     0.08        0.016
  8                    1545.0     0.09        0.024
  8                    1545.5     0.10        0.034
  8                    1546.0     2.78        0.046
  8                    1546.5     3.90        0.060
```

```
**********80-80 LIST OF INPUT DATA (CONTINUED)**********
  8                        1547.0     13.50       0.075
  8                        1547.5     35.18       0.092
  8                        1548.0     69.68       0.112
  8                        1548.5     118.28      0.134
  9 ENDTBL
  3 STRUCT      07
  8                        1542.0     0.0         0.0
  8                        1542.5     0.0         0.005
  8                        1543.0     0.0         0.024
  8                        1543.5     0.0         0.048
  8                        1544.0     0.0         0.078
  8                        1544.5     0.0         0.114
  8                        1545.0     0.0         0.157
  8                        1545.5     0.02        0.207
  8                        1546.0     0.03        0.264
  8                        1546.5     2.71        0.327
  8                        1547.0     10.24       0.393
  8                        1547.5     27.78       0.462
  9 ENDTBL
  3 STRUCT      99
  9 ENDTBL
  6 RUNOFF 1 001        1 1.66114     70.8        0.4699                  C1
  6 REACH  3 001   1    2 1400.0
  6 RUNOFF 1    01      1 0.02127     55.0        0.1813                  PL1
  6 RESVOR 2    01 1    3 1559.5
  6 RUNOFF 1    02      1 0.00839     66.0        0.1449                  PL2
  6 RESVOR 2    02 1    4 1529.5
  6 ADDHYD 4 002   3 4 1
  6 ADDHYD 4 002   1 2 3
  6 RUNOFF 1 002        2 0.07684     70.8        0.2302                  C2
  6 ADDHYD 4 002   2 3 4
  6 REACH  3 002   4    1 1350.0
  6 RUNOFF 1 003        2 0.03474     34.1        0.1354                  C3
  6 RUNOFF 1    07      3 0.00472     74.4        0.1151                  PL5
  6 RESVOR 2    07 3    4 1545.0
  6 ADDHYD 4 003   2 4 3
  6 ADDHYD 4 003   3 1 2
  6 REACH  3 003   2    1 2100.0
  6 RUNOFF 1 004        2 0.08837     57.8        0.2140                  H1
  6 RUNOFF 1 004        3 0.0550      46.5        0.2546                  P1
  6 ADDHYD 4 004   2 3 4
  6 REACH  3 004   4    2 450.0
  6 RUNOFF 1 005        3 0.00149     40.1        0.0519                  H4
  6 RUNOFF 1 005        4 0.00027     56.3        0.0315                  H6
  6 RUNOFF 1    03      5 0.00851     75.5        0.1035                  H2
  6 RESVOR 2    03 5    6 1529.5
  6 ADDHYD 4 005   3 4 5
  6 ADDHYD 4 005   5 6 7
  6 ADDHYD 4 005   7 2 3
  6 REACH  3 005   3    2 1050.0
  6 RUNOFF 1 006        3 0.0043      39.0        0.0963                  H5
  6 ADDHYD 4 006   3 2 7
  6 REACH  3 006   7    2 300.0
  6 RUNOFF 1    06      3 0.00113     97.3        0.0833                  H3
  6 RESVOR 2    06 3    6 1543.0
  6 RUNOFF 1 008        3 0.46625     69.8        0.3313                  R1
  6 ADDHYD 4 008   3 6 4
  6 REACH  3 008   4    3 1275.0
  6 RUNOFF 1    05      5 0.00454     48.1        0.1437                  PL4
  6 RESVOR 2    05 5    4 1458.6
  6 RUNOFF 1 007        6 0.01764     51.0        0.3070                  R2
  6 ADDHYD 4 007   2 4 5
  6 ADDHYD 4 007   5 6 4
  6 ADDHYD 4 007   4 3 5
  6 RUNOFF 1    04      3 0.00638     66.3        0.1123                  PL3
  6 RESVOR 2    04 3    4 1485.8
  6 ADDHYD 4 007   4 5 3
  6 REACH  3 007   3    2 2200.0
  6 RUNOFF 1    99      3 0.4041      60.5        0.3677                  C4
  6 RUNOFF 1    99      4 0.18281     56.9        0.4582                  R3
  6 ADDHYD 4    99 3 4 5
  6 ADDHYD 4    99 1 2 6
  6 ADDHYD 4    99 5 6 7
    ENDATA
  7 INCREM 6              0.10
  7 BASFLO 5              0.10
  7 COMPUT 7 001       99                2.20        1.0     2 2  01  01 1 YEAR
    ENDCMP 1
  7 COMPUT 7 001       99                2.40        1.0     2 2  01  02 2 YEAR
    ENDCMP 1
  7 COMPUT 7 001       99                3.40        1.0     2 2  01  03 10 YEAR
    ENDCMP 1
  7 COMPUT 7 001       99                5.40        1.0     2 2  01  04 100 YEAR
    ENDCMP 1
    ENDJOB 2
0**********END OF 80-80 LIST**********
```

TR20 XEQ SUGARBUSH LP DEVELOPMENT POSTDEVELOPMENT CONDITIONS JOB 1 SUMMARY
REV PC 09/83(.2) F:\PROJECT\02085\SUGARBUSH LP DEVELOPMENT\TR20\SBPST.INP PAGE 15

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 1													
XSECTION 1	RUNOFF	1.66	2	2	.10	.0	2.20	24.00	.34	---	12.25	224.31	135.0
XSECTION 1	REACH	1.66	2	2	.10	.0	2.20	24.00	.34	1591.90	12.25	224.41	135.1
STRUCTURE 1	RUNOFF	.02	2	2	.10	.0	2.20	24.00	.04	---	16.50	.05	2.5
STRUCTURE 1	RESVOR	.02	2	2	.10	.0	2.20	24.00	.00	1559.76	24.20?	.01?	.5
STRUCTURE 2	RUNOFF	.01	2	2	.10	.0	2.20	24.00	.22	---	12.10	.86	102.0
STRUCTURE 2	RESVOR	.01	2	2	.10	.0	2.20	24.00	.12	1530.07	17.90	.06	7.0
XSECTION 2	ADDHYD	.03	2	2	.10	.0	2.20	24.00	.04	1515.00	19.80	.07	2.2
XSECTION 2	ADDHYD	1.69	2	2	.10	.0	2.20	24.00	.34	1517.07	12.25	224.42	132.7
XSECTION 2	RUNOFF	.08	2	2	.10	.0	2.20	24.00	.34	---	12.09	16.17	210.5
XSECTION 2	ADDHYD	1.77	2	2	.10	.0	2.20	24.00	.34	1517.09	12.24	233.10	131.9
XSECTION 2	REACH	1.77	2	2	.10	.0	2.20	24.00	.34	1517.09	12.24	233.10	131.9
XSECTION 3	RUNOFF	.03	2	2	.10	.0	2.20	24.00	.00	---	.00	.00	.0
STRUCTURE 7	RUNOFF	.00	2	2	.10	.0	2.20	24.00	.46	---	12.00	1.87	397.0
STRUCTURE 7	RESVOR	.00	2	2	.10	.0	2.20	24.00	.15	1545.86	24.00?	.03?	5.8
XSECTION 3	ADDHYD	.04	2	2	.10	.0	2.20	24.00	.02	1415.00	24.00?	.03?	.7
XSECTION 3	ADDHYD	1.81	2	2	.10	.0	2.20	24.00	.33	1417.09	12.24	233.11	129.0
XSECTION 3	REACH	1.81	2	2	.10	.0	2.20	24.00	.33	1417.09	12.34	232.38	128.6
XSECTION 4	RUNOFF	.09	2	2	.10	.0	2.20	24.00	.07	---	12.80	.56	6.3
XSECTION 4	RUNOFF	.05	2	2	.10	.0	2.20	24.00	.00	---	.00	.00	.0
XSECTION 4	ADDHYD	.14	2	2	.10	.0	2.20	24.00	.04	1550.02	12.80	.56	3.9
XSECTION 4	REACH	.14	2	2	.10	.0	2.20	24.00	.04	1550.02	12.90	.55	3.8
XSECTION 5	RUNOFF	.00	2	2	.10	.0	2.20	24.00	.00	---	.00	.00	.0
XSECTION 5	RUNOFF	.00	2	2	.10	.0	2.20	24.00	.00	---	.00	.00	.0
STRUCTURE 3	RUNOFF	.01	2	2	.10	.0	2.20	24.00	.50	---	11.99	3.86	453.7
STRUCTURE 3	RESVOR	.01	2	2	.10	.0	2.20	24.00	.15	1531.06	23.80?	.07?	8.4
XSECTION 5	ADDHYD	.00	2	2	.10	.0	2.20	24.00	.00	---	.00?	.00?	.0
XSECTION 5	ADDHYD	.01	2	2	.10	.0	2.20	24.00	.12	1510.00	23.80?	.07?	7.0
XSECTION 5	ADDHYD	.15	2	2	.10	.0	2.20	24.00	.05	1510.02	12.90	.58	3.8
XSECTION 5	REACH	.15	2	2	.10	.0	2.20	24.00	.05	1510.02	13.10	.57	3.7
XSECTION 6	RUNOFF	.00	2	2	.10	.0	2.20	24.00	.00	---	.00	.00	.0
XSECTION 6	ADDHYD	.16	2	2	.10	.0	2.20	24.00	.05	1470.02	13.10	.57	3.6
XSECTION 6	REACH	.16	2	2	.10	.0	2.20	24.00	.05	1470.02	13.10	.57	3.6
STRUCTURE 6	RUNOFF	.00	2	2	.10	.0	2.20	24.00	1.87	---	11.95	1.84	1624.4
STRUCTURE 6	RESVOR	.00	2	2	.10	.0	2.20	24.00	1.85	1545.75	12.04	1.42	1252.9
XSECTION 8	RUNOFF	.47	2	2	.10	.0	2.20	24.00	.31	---	12.15	67.21	144.1
XSECTION 8	ADDHYD	.47	2	2	.10	.0	2.20	24.00	.32	1540.67	12.15	69.72	149.2
XSECTION 8	REACH	.47	2	2	.10	.0	2.20	24.00	.32	1540.67	12.15	69.72	149.2
STRUCTURE 5	RUNOFF	.00	2	2	.10	.0	2.20	24.00	.00	---	.00	.00	.0
STRUCTURE 5	RESVOR	.00	2	2	.10	.0	2.20	24.00	.00	---	.00	.00	.0
XSECTION 7	RUNOFF	.02	2	2	.10	.0	2.20	24.00	.01	---	23.70?	.02?	.9
XSECTION 7	ADDHYD	.16	2	2	.10	.0	2.20	24.00	.04	1452.02	13.10	.57	3.5
XSECTION 7	ADDHYD	.18	2	2	.10	.0	2.20	24.00	.04	1452.02	13.10	.57	3.2
XSECTION 7	ADDHYD	.65	2	2	.10	.0	2.20	24.00	.24	1452.98	12.15	69.73	107.7
STRUCTURE 4	RUNOFF	.01	2	2	.10	.0	2.20	24.00	.22	---	12.00	.83	130.7
STRUCTURE 4	RESVOR	.01	2	2	.10	.0	2.20	24.00	.11	1486.49	23.90?	.03?	4.6
XSECTION 7	ADDHYD	.65	2	2	.10	.0	2.20	24.00	.24	1452.98	12.15	69.74	106.7
XSECTION 7	REACH	.65	2	2	.10	.0	2.20	24.00	.24	1452.96	12.25	67.67	103.5
STRUCTURE 99	RUNOFF	.40	2	2	.10	.0	2.20	24.00	.11	---	12.41	5.71	14.1
STRUCTURE 99	RUNOFF	.18	2	2	.10	.0	2.20	24.00	.06	---	13.50	.82	4.5
STRUCTURE 99	ADDHYD	.59	2	2	.10	.0	2.20	24.00	.09	---	12.40	5.80	9.9
STRUCTURE 99	ADDHYD	2.46	2	2	.10	.0	2.20	24.00	.31	---	12.32	294.98	119.9
STRUCTURE 99	ADDHYD	3.05	2	2	.10	.0	2.20	24.00	.27	---	12.32	300.68	98.7

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 2													
XSECTION 1	RUNOFF	1.66	2	2	.10	.0	2.40	24.00	.43	---	12.24	307.24	185.0
XSECTION 1	REACH	1.66	2	2	.10	.0	2.40	24.00	.43	1592.12	12.24	307.24	185.0
STRUCTURE 1	RUNOFF	.02	2	2	.10	.0	2.40	24.00	.07	---	13.10	.12	5.4
STRUCTURE 1	RESVOR	.02	2	2	.10	.0	2.40	24.00	.02	1559.95	24.20?	.02?	.9
STRUCTURE 2	RUNOFF	.01	2	2	.10	.0	2.40	24.00	.29	---	12.04	1.45	172.7
STRUCTURE 2	RESVOR	.01	2	2	.10	.0	2.40	24.00	.19	1530.14	16.60?	.10?	11.3
XSECTION 2	ADDHYD	.03	2	2	.10	.0	2.40	24.00	.07	1515.00	16.60?	.10?	3.5
XSECTION 2	ADDHYD	1.69	2	2	.10	.0	2.40	24.00	.43	1517.30	12.24	307.25	181.7
XSECTION 2	RUNOFF	.08	2	2	.10	.0	2.40	24.00	.44	---	12.09	21.75	283.0
XSECTION 2	ADDHYD	1.77	2	2	.10	.0	2.40	24.00	.43	1517.33	12.23	319.06	180.5
XSECTION 2	REACH	1.77	2	2	.10	.0	2.40	24.00	.43	1517.33	12.23	319.06	180.5
XSECTION 3	RUNOFF	.03	2	2	.10	.0	2.40	24.00	.00	---	.00	.00	.0
STRUCTURE 7	RUNOFF	.00	2	2	.10	.0	2.40	24.00	.56	---	11.99	2.37	501.8
STRUCTURE 7	RESVOR	.00	2	2	.10	.0	2.40	24.00	.19	1546.00	19.80	.06	11.9
XSECTION 3	ADDHYD	.04	2	2	.10	.0	2.40	24.00	.02	1415.00	19.80	.06	1.4
XSECTION 3	ADDHYD	1.81	2	2	.10	.0	2.40	24.00	.42	1417.33	12.23	319.08	176.6
XSECTION 3	REACH	1.81	2	2	.10	.0	2.40	24.00	.42	1417.33	12.23	319.08	176.6
XSECTION 4	RUNOFF	.09	2	2	.10	.0	2.40	24.00	.11	---	12.30	1.21	13.7
XSECTION 4	RUNOFF	.05	2	2	.10	.0	2.40	24.00	.00	---	23.80?	.02?	.3
XSECTION 4	ADDHYD	.14	2	2	.10	.0	2.40	24.00	.07	1550.05	12.30	1.21	8.5
XSECTION 4	REACH	.14	2	2	.10	.0	2.40	24.00	.07	1550.05	12.40	1.21	8.4
XSECTION 5	RUNOFF	.00	2	2	.10	.0	2.40	24.00	.00	---	.00	.00	.0
XSECTION 5	RUNOFF	.00	2	2	.10	.0	2.40	24.00	.00	---	.00	.00	.0
STRUCTURE 3	RUNOFF	.01	2	2	.10	.0	2.40	24.00	.61	---	11.99	4.81	565.1
STRUCTURE 3	RESVOR	.01	2	2	.10	.0	2.40	24.00	.26	1531.15	17.90?	.12?	14.2
XSECTION 5	ADDHYD	.00	2	2	.10	.0	2.40	24.00	.00	---	.00?	.00?	.0
XSECTION 5	ADDHYD	.01	2	2	.10	.0	2.40	24.00	.21	1510.00	17.90?	.12?	11.7
XSECTION 5	ADDHYD	.15	2	2	.10	.0	2.40	24.00	.08	1510.05	12.40	1.24	8.1
XSECTION 5	REACH	.15	2	2	.10	.0	2.40	24.00	.08	1510.05	12.50	1.22	8.0
XSECTION 6	RUNOFF	.00	2	2	.10	.0	2.40	24.00	.00	---	.00	.00	.0
XSECTION 6	ADDHYD	.16	2	2	.10	.0	2.40	24.00	.07	1470.04	12.50	1.22	7.7
XSECTION 6	REACH	.16	2	2	.10	.0	2.40	24.00	.07	1470.04	12.50	1.22	7.7
STRUCTURE 6	RUNOFF	.00	2	2	.10	.0	2.40	24.00	2.06	---	11.95	2.01	1781.7
STRUCTURE 6	RESVOR	.00	2	2	.10	.0	2.40	24.00	2.04	1545.82	12.02	1.83	1623.3
XSECTION 8	RUNOFF	.47	2	2	.10	.0	2.40	24.00	.40	---	12.14	96.49	207.0
XSECTION 8	ADDHYD	.47	2	2	.10	.0	2.40	24.00	.41	1540.84	12.14	97.43	208.5
XSECTION 8	REACH	.47	2	2	.10	.0	2.40	24.00	.41	1540.84	12.14	97.43	208.5
STRUCTURE 5	RUNOFF	.00	2	2	.10	.0	2.40	24.00	.00	---	.00	.00	.0
STRUCTURE 5	RESVOR	.00	2	2	.10	.0	2.40	24.00	.00	---	.00	.00	.0
XSECTION 7	RUNOFF	.02	2	2	.10	.0	2.40	24.00	.02	---	19.80	.03	1.7
XSECTION 7	ADDHYD	.16	2	2	.10	.0	2.40	24.00	.07	1452.04	12.50	1.22	7.5
XSECTION 7	ADDHYD	.18	2	2	.10	.0	2.40	24.00	.07	1452.04	12.50	1.22	6.8
XSECTION 7	ADDHYD	.65	2	2	.10	.0	2.40	24.00	.31	1453.12	12.14	97.47	150.5
STRUCTURE 4	RUNOFF	.01	2	2	.10	.0	2.40	24.00	.29	---	12.01	1.32	206.7
STRUCTURE 4	RESVOR	.01	2	2	.10	.0	2.40	24.00	.13	1486.50	14.80?	.03?	4.7
XSECTION 7	ADDHYD	.65	2	2	.10	.0	2.40	24.00	.31	1453.12	12.14	97.49	149.1
XSECTION 7	REACH	.65	2	2	.10	.0	2.40	24.00	.31	1453.12	12.14	97.49	149.1
STRUCTURE 99	RUNOFF	.40	2	2	.10	.0	2.40	24.00	.16	---	12.28	12.87	31.8
STRUCTURE 99	RUNOFF	.18	2	2	.10	.0	2.40	24.00	.09	---	12.90	1.74	9.5
STRUCTURE 99	ADDHYD	.59	2	2	.10	.0	2.40	24.00	.14	---	12.30	13.69	23.3
STRUCTURE 99	ADDHYD	2.46	2	2	.10	.0	2.40	24.00	.39	---	12.21	406.41	165.1
STRUCTURE 99	ADDHYD	3.05	2	2	.10	.0	2.40	24.00	.34	---	12.21	419.39	137.6

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID		STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 3														
XSECTION	1	RUNOFF	1.66	2	2	.10	.0	3.40	24.00	.99	---	12.21	826.95	497.8
XSECTION	1	REACH	1.66	2	2	.10	.0	3.40	24.00	.99	1593.15	12.21	826.95	497.8
STRUCTURE	1	RUNOFF	.02	2	2	.10	.0	3.40	24.00	.31	---	12.10	3.09	145.3
STRUCTURE	1	RESVOR	.02	2	2	.10	.0	3.40	24.00	.25	1560.50	16.60?	.29?	13.6
STRUCTURE	2	RUNOFF	.01	2	2	.10	.0	3.40	24.00	.75	---	12.01	4.99	594.2
STRUCTURE	2	RESVOR	.01	2	2	.10	.0	3.40	24.00	.64	1530.84	13.70?	.37?	44.2
XSECTION	2	ADDHYD	.03	2	2	.10	.0	3.40	24.00	.36	1515.02	14.60?	.64?	21.5
XSECTION	2	ADDHYD	1.69	2	2	.10	.0	3.40	24.00	.98	1518.28	12.21	827.26	489.3
XSECTION	2	RUNOFF	.08	2	2	.10	.0	3.40	24.00	.99	---	12.07	55.49	722.2
XSECTION	2	ADDHYD	1.77	2	2	.10	.0	3.40	24.00	.98	1518.33	12.20	859.20	486.1
XSECTION	2	REACH	1.77	2	2	.10	.0	3.40	24.00	.98	1518.33	12.20	859.20	486.1
XSECTION	3	RUNOFF	.03	2	2	.10	.0	3.40	24.00	.00	---	.00	.00	.0
STRUCTURE	7	RUNOFF	.00	2	2	.10	.0	3.40	24.00	1.19	---	11.98	5.20	1101.6
STRUCTURE	7	RESVOR	.00	2	2	.10	.0	3.40	24.00	.82	1546.15	12.30	.84	178.8
XSECTION	3	ADDHYD	.04	2	2	.10	.0	3.40	24.00	.10	1415.02	12.30	.84	21.4
XSECTION	3	ADDHYD	1.81	2	2	.10	.0	3.40	24.00	.96	1418.33	12.20	859.95	475.9
XSECTION	3	REACH	1.81	2	2	.10	.0	3.40	24.00	.96	1418.33	12.20	859.95	475.9
XSECTION	4	RUNOFF	.09	2	2	.10	.0	3.40	24.00	.41	---	12.10	19.56	221.4
XSECTION	4	RUNOFF	.05	2	2	.10	.0	3.40	24.00	.10	---	13.10	.45	8.2
XSECTION	4	ADDHYD	.14	2	2	.10	.0	3.40	24.00	.29	1550.64	12.10	19.56	136.4
XSECTION	4	REACH	.14	2	2	.10	.0	3.40	24.00	.29	1550.64	12.10	19.56	136.4
XSECTION	5	RUNOFF	.00	2	2	.10	.0	3.40	24.00	.00	---	.00	.00	.0
XSECTION	5	RUNOFF	.00	2	2	.10	.0	3.40	24.00	.19	---	12.00	.09	337.9
STRUCTURE	3	RUNOFF	.01	2	2	.10	.0	3.40	24.00	1.25	---	11.98	10.17	1195.0
STRUCTURE	3	RESVOR	.01	2	2	.10	.0	3.40	24.00	.88	1532.06	14.20?	.43?	50.5
XSECTION	5	ADDHYD	.00	2	2	.10	.0	3.40	24.00	.03	1510.00	12.00	.09	51.8
XSECTION	5	ADDHYD	.01	2	2	.10	.0	3.40	24.00	.74	1510.02	14.00	.44	42.4
XSECTION	5	ADDHYD	.15	2	2	.10	.0	3.40	24.00	.32	1510.60	12.10	19.83	129.1
XSECTION	5	REACH	.15	2	2	.10	.0	3.40	24.00	.32	1510.60	12.10	19.83	129.1
XSECTION	6	RUNOFF	.00	2	2	.10	.0	3.40	24.00	.00	---	.00	.00	.0
XSECTION	6	ADDHYD	.16	2	2	.10	.0	3.40	24.00	.31	1470.55	12.10	19.83	125.5
XSECTION	6	REACH	.16	2	2	.10	.0	3.40	24.00	.31	1470.55	12.10	19.83	125.5
STRUCTURE	6	RUNOFF	.00	2	2	.10	.0	3.40	24.00	3.04	---	11.95	2.90	2563.1
STRUCTURE	6	RESVOR	.00	2	2	.10	.0	3.40	24.00	3.08	1545.97	11.99	2.63	2329.7
XSECTION	8	RUNOFF	.47	2	2	.10	.0	3.40	24.00	.94	---	12.12	270.18	579.5
XSECTION	8	ADDHYD	.47	2	2	.10	.0	3.40	24.00	.94	1541.70	12.12	271.75	581.4
XSECTION	8	REACH	.47	2	2	.10	.0	3.40	24.00	.94	1541.70	12.12	271.75	581.4
STRUCTURE	5	RUNOFF	.00	2	2	.10	.0	3.40	24.00	.13	---	12.80	.06	13.8
STRUCTURE	5	RESVOR	.00	2	2	.10	.0	3.40	24.00	.09	1459.00	23.70?	.02?	5.1
XSECTION	7	RUNOFF	.02	2	2	.10	.0	3.40	24.00	.20	---	12.20	.63	35.9
XSECTION	7	ADDHYD	.16	2	2	.10	.0	3.40	24.00	.30	1452.55	12.10	19.83	122.0
XSECTION	7	ADDHYD	.18	2	2	.10	.0	3.40	24.00	.29	1452.55	12.10	20.26	112.5
XSECTION	7	ADDHYD	.65	2	2	.10	.0	3.40	24.00	.76	1453.84	12.12	291.83	450.7
STRUCTURE	4	RUNOFF	.01	2	2	.10	.0	3.40	24.00	.75	---	11.99	4.26	667.4
STRUCTURE	4	RESVOR	.01	2	2	.10	.0	3.40	24.00	.53	1487.44	13.80?	.27?	41.6
XSECTION	7	ADDHYD	.65	2	2	.10	.0	3.40	24.00	.76	1453.84	12.12	291.86	446.3
XSECTION	7	REACH	.65	2	2	.10	.0	3.40	24.00	.76	1453.84	12.12	291.86	446.3
STRUCTURE	99	RUNOFF	.40	2	2	.10	.0	3.40	24.00	.51	---	12.18	91.73	227.0
STRUCTURE	99	RUNOFF	.18	2	2	.10	.0	3.40	24.00	.38	---	12.28	21.42	117.2
STRUCTURE	99	ADDHYD	.59	2	2	.10	.0	3.40	24.00	.47	---	12.20	111.65	190.2
STRUCTURE	99	ADDHYD	2.46	2	2	.10	.0	3.40	24.00	.91	---	12.17	1118.36	454.4
STRUCTURE	99	ADDHYD	3.05	2	2	.10	.0	3.40	24.00	.82	---	12.18	1228.97	403.2

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
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SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 4													
XSECTION 1	RUNOFF	1.66	2	2	.10	.0	5.40	24.00	2.40	---	12.19	2150.80	1294.8
XSECTION 1	REACH	1.66	2	2	.10	.0	5.40	24.00	2.40	1595.34	12.19	2150.80	1294.8
STRUCTURE 1	RUNOFF	.02	2	2	.10	.0	5.40	24.00	1.19	---	12.04	18.35	862.8
STRUCTURE 1	RESVOR	.02	2	2	.10	.0	5.40	24.00	1.11	1561.44	12.22	9.77	459.6
STRUCTURE 2	RUNOFF	.01	2	2	.10	.0	5.40	24.00	2.00	---	12.00	14.50	1727.9
STRUCTURE 2	RESVOR	.01	2	2	.10	.0	5.40	24.00	1.88	1532.05	12.20	5.30	632.1
XSECTION 2	ADDHYD	.03	2	2	.10	.0	5.40	24.00	1.33	1515.42	12.21	15.07	507.9
XSECTION 2	ADDHYD	1.69	2	2	.10	.0	5.40	24.00	2.38	1520.23	12.19	2165.67	1280.9
XSECTION 2	RUNOFF	.08	2	2	.10	.0	5.40	24.00	2.41	---	12.05	139.65	1817.4
XSECTION 2	ADDHYD	1.77	2	2	.10	.0	5.40	24.00	2.39	1520.35	12.18	2250.53	1273.2
XSECTION 2	REACH	1.77	2	2	.10	.0	5.40	24.00	2.39	1520.35	12.18	2250.53	1273.2
XSECTION 3	RUNOFF	.03	2	2	.10	.0	5.40	24.00	.11	---	13.50	.28	8.1
STRUCTURE 7	RUNOFF	.00	2	2	.10	.0	5.40	24.00	2.70	---	11.98	11.84	2508.1
STRUCTURE 7	RESVOR	.00	2	2	.10	.0	5.40	24.00	2.33	1546.84	12.09	7.76	1645.0
XSECTION 3	ADDHYD	.04	2	2	.10	.0	5.40	24.00	.38	1415.22	12.09	7.76	196.8
XSECTION 3	ADDHYD	1.81	2	2	.10	.0	5.40	24.00	2.34	1420.36	12.18	2256.41	1248.6
XSECTION 3	REACH	1.81	2	2	.10	.0	5.40	24.00	2.34	1420.36	12.18	2256.41	1248.6
XSECTION 4	RUNOFF	.09	2	2	.10	.0	5.40	24.00	1.38	---	12.06	88.37	999.9
XSECTION 4	RUNOFF	.05	2	2	.10	.0	5.40	24.00	.66	---	12.12	18.11	329.3
XSECTION 4	ADDHYD	.14	2	2	.10	.0	5.40	24.00	1.11	1552.08	12.07	105.07	732.9
XSECTION 4	REACH	.14	2	2	.10	.0	5.40	24.00	1.11	1552.08	12.07	105.07	732.9
XSECTION 5	RUNOFF	.00	2	2	.10	.0	5.40	24.00	.33	---	12.00	.26	172.7
XSECTION 5	RUNOFF	.00	2	2	.10	.0	5.40	24.00	1.28	---	12.00	.36	1349.2
STRUCTURE 3	RUNOFF	.01	2	2	.10	.0	5.40	24.00	2.79	---	11.97	22.54	2648.1
STRUCTURE 3	RESVOR	.01	2	2	.10	.0	5.40	24.00	2.40	1533.40	12.13	9.37	1100.6
XSECTION 5	ADDHYD	.00	2	2	.10	.0	5.40	24.00	.48	1510.02	12.00	.62	353.2
XSECTION 5	ADDHYD	.01	2	2	.10	.0	5.40	24.00	2.07	1510.37	12.13	9.46	921.0
XSECTION 5	ADDHYD	.15	2	2	.10	.0	5.40	24.00	1.17	1511.71	12.08	113.50	738.8
XSECTION 5	REACH	.15	2	2	.10	.0	5.40	24.00	1.17	1511.71	12.08	113.50	738.8
XSECTION 6	RUNOFF	.00	2	2	.10	.0	5.40	24.00	.29	---	12.10	.24	56.2
XSECTION 6	ADDHYD	.16	2	2	.10	.0	5.40	24.00	1.15	1471.20	12.08	113.74	720.2
XSECTION 6	REACH	.16	2	2	.10	.0	5.40	24.00	1.15	1471.20	12.08	113.74	720.2
STRUCTURE 6	RUNOFF	.00	2	2	.10	.0	5.40	24.00	5.01	---	11.95	4.65	4113.1
STRUCTURE 6	RESVOR	.00	2	2	.10	.0	5.40	24.00	5.07	1546.40	12.01	3.67	3244.0
XSECTION 8	RUNOFF	.47	2	2	.10	.0	5.40	24.00	2.32	---	12.11	715.09	1533.7
XSECTION 8	ADDHYD	.47	2	2	.10	.0	5.40	24.00	2.33	1543.63	12.11	718.24	1536.7
XSECTION 8	REACH	.47	2	2	.10	.0	5.40	24.00	2.33	1543.63	12.11	718.24	1536.7
STRUCTURE 5	RUNOFF	.00	2	2	.10	.0	5.40	24.00	.75	---	12.03	2.25	496.4
STRUCTURE 5	RESVOR	.00	2	2	.10	.0	5.40	24.00	.72	1459.26	12.15	1.40	309.3
XSECTION 7	RUNOFF	.02	2	2	.10	.0	5.40	24.00	.92	---	12.13	8.90	504.3
XSECTION 7	ADDHYD	.16	2	2	.10	.0	5.40	24.00	1.13	1453.20	12.08	114.95	707.5
XSECTION 7	ADDHYD	.18	2	2	.10	.0	5.40	24.00	1.11	1453.25	12.09	123.43	685.2
XSECTION 7	ADDHYD	.65	2	2	.10	.0	5.40	24.00	1.99	1454.95	12.10	840.54	1298.1
STRUCTURE 4	RUNOFF	.01	2	2	.10	.0	5.40	24.00	2.01	---	11.98	12.01	1882.6
STRUCTURE 4	RESVOR	.01	2	2	.10	.0	5.40	24.00	1.78	1488.36	12.17	3.95	619.6
XSECTION 7	ADDHYD	.65	2	2	.10	.0	5.40	24.00	1.99	1454.95	12.10	844.45	1291.4
XSECTION 7	REACH	.65	2	2	.10	.0	5.40	24.00	1.99	1454.95	12.10	844.45	1291.4
STRUCTURE 99	RUNOFF	.40	2	2	.10	.0	5.40	24.00	1.58	---	12.14	374.15	925.9
STRUCTURE 99	RUNOFF	.18	2	2	.10	.0	5.40	24.00	1.32	---	12.21	116.88	639.3
STRUCTURE 99	ADDHYD	.59	2	2	.10	.0	5.40	24.00	1.50	---	12.15	478.73	815.7
STRUCTURE 99	ADDHYD	2.46	2	2	.10	.0	5.40	24.00	2.25	---	12.14	3053.77	1240.9
STRUCTURE 99	ADDHYD	3.05	2	2	.10	.0	5.40	24.00	2.10	---	12.15	3538.25	1160.9

Pioneer Environmental Associates LLC.
Project: Sugarbush Lincoln Peak Development
Date: 3/6/03
Phase: Postdevelopment

Basin Summary Sheet

Basin Design and water surface elevations

Basin	Sub Watershed	Basin design				Water Surface Elevations by Storm (ft)			
		Normal Water El. (ft)	Riser Outlet El. (ft)	Spillway El. (ft)	Top of Berm El. (ft)	1 year storm	2 year storm	10 year storm	100 year storm
01	PL1	1559.5	1560.5	1561.0	1563.0	1559.8	1560.0	1560.5	1561.4
02	PL2	1529.5	1531.0	1532.0	1534.0	1530.1	1530.1	1530.8	1532.1
03	H2	1529.5	1532.5	1533.0	1535.0	1531.1	1531.2	1532.1	1533.4
04	PL3	1485.8	1487.5	1489.0	1491.0	1486.5	1486.5	1487.4	1488.4
05	PL4	1458.6	1459.0	1459.5	1461.5	1458.6	1458.6	1459.0	1459.3
06	H3	1543.0	1545.5	1546.5	1548.5	1545.8	1545.8	1546.0	1546.4
07	PL5	1545.0	1546.0	1546.5	1547.5	1545.9	1546.0	1546.2	1546.8

Postdevelopment Peak Rates of Inflow and Outflow from Basins

Basin	Sub Watershed	Basin Inflow and Outflow by Storm (cfs)											
		1 year storm			2 year storm			10 year storm			100 year storm		
		Inflow	Ouflow	%Change	Inflow	Ouflow	%Change	Inflow	Ouflow	%Change	Inflow	Ouflow	%Change
01	PL1	0.05	0.01	-80.0%	0.12	0.02	-83.3%	3.09	0.29	-90.6%	18.4	9.77	-46.9%
02	PL2	0.86	0.06	-93.0%	1.45	0.1	-93.1%	4.99	0.37	-92.6%	14.5	5.3	-63.4%
03	H2	3.86	0.07	-98.2%	4.81	0.12	-97.5%	10.2	0.43	-95.8%	22.5	9.37	-58.4%
04	PL3	0.83	0.03	-96.4%	1.32	0.03	-97.7%	4.26	0.27	-93.7%	12.0	3.95	-67.1%
05	PL4	0	0	0.0%	0	0	0.0%	0.06	0.02	-66.7%	2.25	1.4	-37.8%
06	H3	1.84	1.42	-22.8%	2.01	1.83	-9.0%	2.9	2.63	-9.3%	4.65	3.67	-21.1%
07	PL5	1.87	0.03	-98.4%	2.37	0.06	-97.5%	5.2	0.84	-83.8%	11.84	7.76	-34.5%

Pioneer Environmental Associates LLC.
Project: Sugarbush Lincoln Peak Development
Date: 3/6/03

Peak Flow Rates Comparison at Stream Cross Sections for Development Conditions

1 Year Storm Event

Cross Section	Stream	Peak Discharge Rate for Site Conditions				
		Q (cfs) Predevelopment	Q (cfs) Existing	Percent Change	Q (cfs) Postdevelopment	Percent Change*
1	Clay	224	224	0.0%	224	0.0%
2	Clay	233	233	0.0%	233	0.0%
3	Clay	233	233	0.0%	233	0.0%
4	Hotel	0.58	1.08	86.2%	0.56	-3.4%
5	Hotel	0.57	1.08	89.5%	0.58	1.8%
6	Hotel	0.56	1.06	89.3%	0.57	1.8%
8	Rice	67.2	67.3	0.1%	69.7	3.7%
7	Rice	67.2	67.3	0.1%	69.7	3.8%
9	Rice + Clay	300	300	0.0%	301	0.2%

* Percent change from predevelopment conditions

2 Year Storm Event

Cross Section	Stream	Peak Discharge Rate for Site Conditions				
		Q (cfs) Predevelopment	Q (cfs) Existing	Percent Change	Q (cfs) Postdevelopment	Percent Change*
1	Clay	307	307	0.1%	307	0.0%
2	Clay	319	319	0.0%	319	0.0%
3	Clay	319	319	-0.1%	319	0.0%
4	Hotel	1.26	3.11	146.8%	1.21	-4.0%
5	Hotel	1.25	3.11	148.8%	1.24	-0.8%
6	Hotel	1.24	3.11	150.8%	1.22	-1.6%
8	Rice	96.5	96.7	0.2%	97.4	1.0%
7	Rice	96.5	99.8	3.4%	97.5	1.0%
9	Rice + Clay	419	421	0.6%	419	0.2%

* Percent change from predevelopment conditions

Pioneer Environmental Associates LLC.
Project: Sugarbush Lincoln Peak Development
Date: 3/6/03

Peak Flow Rates Comparison at Stream Cross Sections for Development Conditions

10 Year Storm Event

Cross Section	Stream	Peak Discharge Rate for Site Conditions				
		Q (cfs) Predevelopment	Q (cfs) Existing	Percent Change	Q (cfs) Postdevelopment	Percent Change*
1	Clay	827	827	0.0%	827	0.0%
2	Clay	860	859	-0.1%	859	-0.1%
3	Clay	860	859	-0.1%	860	0.0%
4	Hotel	19.8	23.8	19.9%	19.6	-1.4%
5	Hotel	19.8	23.8	20.0%	19.8	0.0%
6	Hotel	19.8	23.8	20.0%	19.8	0.0%
8	Rice	270	271	0.4%	272	0.6%
7	Rice	290	294	1.3%	292	0.6%
9	Rice + Clay	1225	1227	0.1%	1229	0.3%

* Percent change from predevelopment conditions

100 Year Storm Event

Cross Section	Stream	Peak Discharge Rate for Site Conditions				
		Q (cfs) Predevelopment	Q (cfs) Existing	Percent Change	Q (cfs) Postdevelopment	Percent Change*
1	Clay	2151	2151	0.0%	2151	0.0%
2	Clay	2238	2239	0.0%	2251	0.6%
3	Clay	2238	2239	0.0%	2256	0.8%
4	Hotel	106	108	1.9%	105	-0.9%
5	Hotel	106	112	5.7%	114	7.1%
6	Hotel	106	112	5.7%	114	7.3%
8	Rice	715	716	0.2%	718	0.4%
7	Rice	825	832	0.8%	844	2.4%
9	Rice + Clay	3498	3506	0.2%	3538	1.2%

* Percent change from predevelopment conditions

Sugarbush - Existing Conditions
Selected Stormwater Contributors
Februrary 19, 2003

400 0 400 800 Feet

Sources:DOQ - VT Mapping Program (1995)
Roads - VCGI E911 Roads Layer (2001)
Stormshed - Pioneer Environmental Assoc. (2003)

Road
Stormwater Contribution Areas
Surface Water

PIONEER ENVIRONMENTAL ASSOCIATES, LLC.
CONSULTING SCIENTISTS
10 Seymour St. P.O. Box 824
Middlebury, Vermont 05753
Phone: 802-388-1210
Fax: 802-388-1423
email: pioneere@sover.net

F:\PROJECT\02085 Sugarbush LP Development\GIS\sug_stormwater.apr (Existing Stormwater)

Sugarbush - Post Development
Selected Stormwater Contributors
February 11, 2003

400 0 400 800 Feet

Sources:DOQ - VT Mapping Program (1995)
Roads - VCGI E911 Roads Layer (2001)
Stormshed - Pioneer Environmental Assoc. (2003)

Road
Stormwater Contribution Areas Post-Development
Surface Water

PIONEER ENVIRONMENTAL ASSOCIATES, LLC.
CONSULTING SCIENTISTS
10 Seymour St. P.O. Box 824
Middlebury, Vermont 05753
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Fax: 802-388-1423
email: pioneere@sover.net

F:\PROJECT\02085 Sugarbush LP Development\GIS\sug_stormwater.apr (Proposed Stormwater)

Sugarbush Lincoln Peak Development WIP Plan

Existing Condition TSS Load Calculations (Ranked By Load)- Simulation 1

Pioneer Environmental Associates, LLC, 02-24-03

Site Name	Ownership	Subwatershed ID	Annual Precipitation (inches)	Runoff Event Fraction (inches)	Imperv. Cover (acres)	Drainage Area (acres)	% Impervious	Runoff Coefficient	Annual Runoff (inches)	Land Use	C Value (mg/L)	TSS Load (lbs/yr)	Device Code	Device % Removal	Post Trtmt TSS (lbs/yr)	Total (lbs/yr)	%
Sports Center	Sugarbush	Rice Brook	42	0.9	4.33	9.87	0.44	0.45	16.82	Commercial	77	2,890	NONE	0	2,890		
Wastewater	Sugarbush	Rice Brook	42	0.9	2.57	11.15	0.23	0.26	9.74	Commercial	77	1,889	NONE	0	1,889		
Miguels	Sugarbush	Rice Brook	42	0.9	0.59	2.75	0.21	0.24	9.13	Commercial	77	437	NONE	0	437		
Valley House	Sugarbush	Clay Brook	42	0.9	0.39	4.38	0.09	0.13	4.92	Commercial	77	375	NONE	0	375		
Admin	Sugarbush	Rice Brook	42	0.9	0.43	1.47	0.30	0.32	11.97	Med Residential	77	305	NONE	0	305	5,896	12.2%
Main LP Parking	*Sugarbush*	*Hotel Brook*	*42*	*0.9*	*12.54*	*15.03*	*0.83*	*0.80*	*30.28*	*Parking*	*141*	*14,502*	*UDP*	*25*	*10,876*		
22 Acre Site	*Sugarbush*	*Clay Brook*	*42*	*0.9*	*2.19*	*2.70*	*0.81*	*0.78*	*29.48*	*Parking*	*141*	*2,538*	*NONE*	*0*	*2,538*		
Lower LP Parking	*Sugarbush*	*Clay Brook*	*42*	*0.9*	*1.14*	*1.53*	*0.75*	*0.72*	*27.25*	*Parking*	*141*	*1,330*	*CB*	*10*	*1,197*		
Parking /Village	*Sugarbush*	*Rice Brook*	*42*	*0.9*	*0.66*	*1.50*	*0.44*	*0.44*	*16.73*	*Parking*	*141*	*801*	*NONE*	*0*	*801*		
Gate House	*Sugarbush*	*Hotel Brook*	*42*	*0.9*	*0.51*	*1.34*	*0.38*	*0.39*	*14.91*	*Commercial*	*77*	*348*	*CB*	*10*	*314*	15,726	32.5%
Upper-Vill 02	Sugarbush/Private	Rice Brook	42	0.9	3.42	19.32	0.18	0.21	7.92	Med Residential	70	2,419	CB	10	2,177		
Upper-Vill 03	Sugarbush/Private	Rice Brook	42	0.9	2.58	12.46	0.21	0.24	8.94	Med Residential	70	1,763	CB	10	1,586		
Upper-Vill 04	Sugarbush/Private	Rice Brook	42	0.9	1.16	6.59	0.18	0.21	7.85	Med Residential	70	819	CB	10	737		
Upper-Vill 01	Sugarbush/Private	Rice Brook	42	0.9	0.40	9.57	0.04	0.09	3.32	Med Residential	70	502	CB	10	452		
Upper-Vill 05	Sugarbush/Private	Rice Brook	42	0.9	0.74	2.86	0.26	0.28	10.63	Med Residential	70	481	CB	10	433	5,385	11.1%
Bridges	Private	Rice Brook	42	0.9	7.80	15.92	0.49	0.49	18.55	Med Residential	70	4,671	CB	10	4,204		
South-Vill	Private	Clay Brook	42	0.9	6.39	34.72	0.18	0.22	8.15	Med Residential	70	4,476	CB	10	4,029		
Upper-Vill 06	Private	Rice Brook	42	0.9	5.50	13.75	0.40	0.41	15.50	Med Residential	70	3,372	CB	10	3,035		
SB-Vill 01	Private	Rice Brook	42	0.9	4.90	13.37	0.37	0.38	14.35	Med Residential	70	3,034	CB	10	2,731		
Snowcreek	Private	Clay Brook	42	0.9	3.43	9.89	0.35	0.36	13.70	Med Residential	70	2,143	CB	10	1,928		
SB-Vill 04	Private	Rice Brook	42	0.9	3.39	9.96	0.34	0.36	13.47	Med Residential	70	2,122	CB	10	1,909		
SB-Vill 02	Private	Rice Brook	42	0.9	2.78	10.92	0.25	0.28	10.56	Med Residential	70	1,824	CB	10	1,641		
SB-Vill 03	Private	Rice Brook	42	0.9	1.76	4.49	0.39	0.40	15.23	Med Residential	70	1,081	CB	10	973		
Sam Ruperts	Private	Clay Brook	42	0.9	0.93	2.00	0.47	0.47	17.82	Commercial	77	619	NONE	0	619		
South-Vill Sprt	Private	Clay Brook	42	0.9	0.81	2.53	0.32	0.34	12.80	Urban	51	374	CB	10	336	21,405	44.2%
															Grand Total:	48,412	

Annual Runoff Calculated By:

R = P * Pj * Rv,

where: Rv = 0.05 + 0.9Ia

R= Annual Runoff

P= Annual Precip.

Pj= Fraction of rainfall events that produce runoff

Rv= Runoff Coefficient

Ia= % Impervious Cover

Annual Pollutant Load Calculated By:

L= 0.226*R*C*A, where

0.226 = Conversion Factor

R = Annual Runoff in Inches

C = Pollutant Concentration in mg/L

A = Site area in acres

Italics indicates contributing area to be altered by proposed Lincoln Peak Development.

All calculations subject to field verification during Spring/Summer/Fall 2003.

Precipitation value from Sugarbush EIS.

Sugarbush Lincoln Peak Development WIP Plan

Post Development Condition TSS Load Calculations (Ranked By Load)- Simulation 1

Pioneer Environmental Associates, LLC, 02-24-03

Site Name	Ownership	Subwatershed ID	Annual Precipitation (inches)	Runoff Event Fraction (inches)	Imperv. Cover (acres)	Drainage Area (acres)	% Impervious	Runoff Coefficient	Annual Runoff (inches)	Land Use	C Value (mg/L)	TSS Load (lbs/yr)	Device Code	Device % Removal	Post Trtmt TSS (lbs/yr)	Total (lbs/yr)	%
Sports Center	Sugarbush	Rice Brook	42	0.9	4.552	9.759	0.47	0.47	17.76	Commercial	77	3,016	NONE	0	3,016		
Wastewater	Sugarbush	Rice Brook	42	0.9	2.615	11.152	0.23	0.26	9.87	Commercial	77	1,915	NONE	0	1,915		
Miguels	Sugarbush	Rice Brook	42	0.9	0.585	2.750	0.21	0.24	9.13	Commercial	77	437	NONE	0	437		
Valley House	Sugarbush	Clay Brook	42	0.9	0.354	4.375	0.08	0.12	4.64	Commercial	77	353	NONE	0	353		
Admin	Sugarbush	Rice Brook	42	0.9	0.434	1.465	0.30	0.32	11.97	Commercial	77	305	NONE	0	305	6,026	16.0%
Village/Lower Parking	*Sugarbush*	*Rice Brook*	*42*	*0.9*	*8.776*	*15.183*	*0.58*	*0.57*	*21.55*	*Parking*	*141*	*10,428*	*WP*	*80*	*2,086*		
Main LP Parking	*Sugarbush*	*Clay Brook*	*42*	*0.9*	*8.351*	*10.948*	*0.76*	*0.74*	*27.84*	*Parking*	*141*	*9,713*	*WP*	*80*	*1,943*		
22 Acre Site	*Sugarbush*	*Clay Brook*	*42*	*0.9*	*2.631*	*4.037*	*0.65*	*0.64*	*24.06*	*Parking*	*141*	*3,095*	*WP*	*80*	*619*		
Hotel	*Sugarbush*	*Hotel Brook*	*42*	*0.9*	*0.982*	*1.670*	*0.59*	*0.58*	*21.89*	*Commercial*	*77*	*636*	*WP*	*80*	*127*		
Gate House	*Sugarbush*	*Hotel Brook*	*42*	*0.9*	*0.941*	*1.343*	*0.70*	*0.68*	*25.73*	*Commercial*	*77*	*601*	*WP*	*80*	*120*	4,895	13.0%
Upper-Vill 02	Sugarbush/Private	Rice Brook	42	0.9	3.453	19.321	0.18	0.21	7.97	Med Residential	70	2,436	CB	10	2,192		
Upper-Vill 03	Sugarbush/Private	Rice Brook	42	0.9	2.583	12.461	0.21	0.24	8.94	Med Residential	70	1,763	CB	10	1,586		
Upper-Vill 04	Sugarbush/Private	Rice Brook	42	0.9	1.124	6.592	0.17	0.20	7.69	Med Residential	70	802	CB	10	722		
Upper-Vill 01	Sugarbush/Private	Rice Brook	42	0.9	0.401	9.567	0.04	0.09	3.32	Med Residential	70	502	CB	10	452		
Upper-Vill 05	Sugarbush/Private	Rice Brook	42	0.9	0.735	2.861	0.26	0.28	10.63	Med Residential	70	481	CB	10	433	5,385	14.3%
Bridges	Private	Rice Brook	42	0.9	7.599	15.915	0.48	0.48	18.13	Med Residential	70	4,566	CB	10	4,109		
South-Vill	Private	Clay Brook	42	0.9	6.388	34.721	0.18	0.22	8.15	Med Residential	70	4,476	CB	10	4,029		
Upper-Vill 06	Private	Rice Brook	42	0.9	5.517	13.749	0.40	0.41	15.54	Med Residential	70	3,380	CB	10	3,042		
SB-Vill 01	Private	Rice Brook	42	0.9	5.142	13.368	0.38	0.40	14.98	Med Residential	70	3,167	CB	10	2,850		
Snowcreek	Private	Clay Brook	42	0.9	3.432	9.886	0.35	0.36	13.70	Med Residential	70	2,143	CB	10	1,928		
SB-Vill 04	Private	Rice Brook	42	0.9	3.389	9.957	0.34	0.36	13.47	Med Residential	70	2,122	CB	10	1,909		
SB-Vill 02	Private	Rice Brook	42	0.9	2.805	10.918	0.26	0.28	10.63	Med Residential	70	1,836	CB	10	1,652		
SB-Vill 03	Private	Rice Brook	42	0.9	1.768	4.485	0.39	0.40	15.30	Med Residential	70	1,086	CB	10	977		
Sam Ruperts	Private	Clay Brook	42	0.9	0.957	1.995	0.48	0.48	18.21	Commercial	77	632	NONE	0	632		
South-Vill Sprt	Private	Clay Brook	42	0.9	0.812	2.533	0.32	0.34	12.80	Urban	51	374	CB	10	336	21,466	56.8%
															Grand Total:	37,772	

Annual Runoff Calculated By:

R = P * Pj * Rv,

where: Rv = 0.05 + 0.9Ia

R= Annual Runoff

P= Annual Precip.

Pj= Fraction of rainfall events that produce runoff

Rv= Runoff Coefficient

Ia= % Impervious Cover

Annual Pollutant Load Calculated By:

L= 0.226*R*C*A, where

0.226 = Conversion Factor

R = Annual Runoff in Inches

C = Pollutant Concentration in mg/L

A = Site area in acres

Italics indicates contributing area to be altered by proposed Lincoln Peak Development.

All calculations subject to field verification during Spring/Summer/Fall 2003.

Precipitation value from Sugarbush EIS.

Sugarbush Lincoln Peak Development WIP Plan

Existing Condition TSS Load Calculations (Ranked By Load, and Separated By Watershed)- Simulation 1

Pioneer Environmental Associates, LLC, 02-27-03

Site Name	Ownership	Subwatershed ID	Annual Precipitation (inches)	Runoff Event Fraction (inches)	Imperv. Cover (acres)	Drainage Area (acres)	% Impervious	Runoff Coefficient	Annual Runoff (inches)	Land Use	C Value (mg/L)	TSS Load (lbs/yr)	Device Code	Device % Removal	Post Trtmt TSS (lbs/yr)	Total (lbs/yr)	%
Sports Center	Sugarbush	Rice Brook	42	0.9	4.33	9.87	0.44	0.45	16.82	Commercial	77	2,890	NONE	0	2,890		
Wastewater	Sugarbush	Rice Brook	42	0.9	2.57	11.15	0.23	0.26	9.74	Commercial	77	1,889	NONE	0	1,889		
Miguels	Sugarbush	Rice Brook	42	0.9	0.59	2.75	0.21	0.24	9.13	Commercial	77	437	NONE	0	437		
Admin	Sugarbush	Rice Brook	42	0.9	0.43	1.47	0.30	0.32	11.97	Med Residential	77	305	NONE	0	305	5,521	14.8%
Main LP Parking	*Sugarbush*	*Hotel Brook*	*42*	*0.9*	*12.54*	*15.03*	*0.83*	*0.80*	*30.28*	*Parking*	*141*	*14,502*	*UDP*	*25*	*10,876*		
Parking /Village	*Sugarbush*	*Rice Brook*	*42*	*0.9*	*0.66*	*1.50*	*0.44*	*0.44*	*16.73*	*Parking*	*141*	*801*	*NONE*	*0*	*801*		
Gate House	*Sugarbush*	*Hotel Brook*	*42*	*0.9*	*0.51*	*1.34*	*0.38*	*0.39*	*14.91*	*Commercial*	*77*	*348*	*CB*	*10*	*314*	11,990	32.1%
Upper-Vill 02	Sugarbush/Private	Rice Brook	42	0.9	3.42	19.32	0.18	0.21	7.92	Med Residential	70	2,419	CB	10	2,177		
Upper-Vill 03	Sugarbush/Private	Rice Brook	42	0.9	2.58	12.46	0.21	0.24	8.94	Med Residential	70	1,763	CB	10	1,586		
Upper-Vill 04	Sugarbush/Private	Rice Brook	42	0.9	1.16	6.59	0.18	0.21	7.85	Med Residential	70	819	CB	10	737		
Upper-Vill 01	Sugarbush/Private	Rice Brook	42	0.9	0.40	9.57	0.04	0.09	3.32	Med Residential	70	502	CB	10	452		
Upper-Vill 05	Sugarbush/Private	Rice Brook	42	0.9	0.74	2.86	0.26	0.28	10.63	Med Residential	70	481	CB	10	433	5,385	14.4%
Bridges	Private	Rice Brook	42	0.9	7.80	15.92	0.49	0.49	18.55	Med Residential	70	4,671	CB	10	4,204		
Upper-Vill 06	Private	Rice Brook	42	0.9	5.50	13.75	0.40	0.41	15.50	Med Residential	70	3,372	CB	10	3,035		
SB-Vill 01	Private	Rice Brook	42	0.9	4.90	13.37	0.37	0.38	14.35	Med Residential	70	3,034	CB	10	2,731		
SB-Vill 04	Private	Rice Brook	42	0.9	3.39	9.96	0.34	0.36	13.47	Med Residential	70	2,122	CB	10	1,909		
SB-Vill 02	Private	Rice Brook	42	0.9	2.78	10.92	0.25	0.28	10.56	Med Residential	70	1,824	CB	10	1,641		
SB-Vill 03	Private	Rice Brook	42	0.9	1.76	4.49	0.39	0.40	15.23	Med Residential	70	1,081	CB	10	973	14,493	38.8%
															Rice Brook Total:	37,390	100.0%
Valley House	Sugarbush	Clay Brook	42	0.9	0.39	4.38	0.09	0.13	4.92	Commercial	77	375	NONE	0	375	375	3.4%
22 Acre Site	*Sugarbush*	*Clay Brook*	*42*	*0.9*	*2.19*	*2.70*	*0.81*	*0.78*	*29.48*	*Parking*	*141*	*2,538*	*NONE*	*0*	*2,538*		
Lower LP Parking	*Sugarbush*	*Clay Brook*	*42*	*0.9*	*1.14*	*1.53*	*0.75*	*0.72*	*27.25*	*Parking*	*141*	*1,330*	*CB*	*10*	*1,197*	3,735	33.9%
South-Vill	Private	Clay Brook	42	0.9	6.39	34.72	0.18	0.22	8.15	Med Residential	70	4,476	CB	10	4,029		
Snowcreek	Private	Clay Brook	42	0.9	3.43	9.89	0.35	0.36	13.70	Med Residential	70	2,143	CB	10	1,928		
Sam Ruperts	Private	Clay Brook	42	0.9	0.93	2.00	0.47	0.47	17.82	Commercial	77	619	NONE	0	619		
South-Vill Sprt	Private	Clay Brook	42	0.9	0.81	2.53	0.32	0.34	12.80	Urban	51	374	CB	10	336	6,912	62.7%
															Clay Brook Total:	11,022	100.0%
															Grand Total:	48,412	n/a

Annual Runoff Calculated By:

R = P * Pj * Rv,

where: Rv = 0.05 + 0.9Ia

R= Annual Runoff

P= Annual Precip.

Pj= Fraction of rainfall events that produce runoff

Rv= Runoff Coefficient

Ia= % Impervious Cover

Annual Pollutant Load Calculated By:

L= 0.226*R*C*A, where

0.226 = Conversion Factor

R = Annual Runoff in Inches

C = Pollutant Concentration in mg/L

A = Site area in acres

Italics indicates contributing area to be altered by proposed Lincoln Peak Development.

All calculations subject to field verification during Spring/Summer/Fall 2003.

Precipitation value from Sugarbush EIS.

POST DEV

...k Development WIP Plan

...t Condition TSS Load Calculations (Ranked By Load, and Separated By Watershed)- Simulation 1

...ronmental Associates, LLC, 02-27-03

Site Name	Ownership	Subwatershed ID	Annual Precipitation (inches)	Runoff Event Fraction (inches)	Imperv. Cover (acres)	Drainage Area (acres)	% Impervious	Runoff Coefficient	Annual Runoff (inches)	Land Use	C Value (mg/L)	TSS Load (lbs/yr)	Device Code	Device % Removal	Post Trtmt TSS (lbs/yr)	Total (lbs/yr)	%
Sports Center	Sugarbush	Rice Brook	42	0.9	4.552	9.759	0.47	0.47	17.76	Commercial	77	3,016	NONE	0	3,016		
Wastewater	Sugarbush	Rice Brook	42	0.9	2.615	11.152	0.23	0.26	9.87	Commercial	77	1,915	NONE	0	1,915		
Miguels	Sugarbush	Rice Brook	42	0.9	0.585	2.750	0.21	0.24	9.13	Commercial	77	437	NONE	0	437		
Admin	Sugarbush	Rice Brook	42	0.9	0.434	1.465	0.30	0.32	11.97	Commercial	77	305	NONE	0	305	5,673	20.3%
Village/Lower Parking	*Sugarbush*	*Rice Brook*	*42*	*0.9*	*8.776*	*15.183*	*0.58*	*0.57*	*21.55*	*Parking*	*141*	*10,428*	*WP*	*80*	*2,086*		
Hotel	*Sugarbush*	*Hotel Brook*	*42*	*0.9*	*0.982*	*1.670*	*0.59*	*0.58*	*21.89*	*Commercial*	*77*	*636*	*WP*	*80*	*127*		
Gate House	*Sugarbush*	*Hotel Brook*	*42*	*0.9*	*0.941*	*1.343*	*0.70*	*0.68*	*25.73*	*Commercial*	*77*	*601*	*WP*	*80*	*120*	2,333	8.4%
Upper-Vill 02	Sugarbush/Private	Rice Brook	42	0.9	3.453	19.321	0.18	0.21	7.97	Med Residential	70	2,436	CB	10	2,192		
Upper-Vill 03	Sugarbush/Private	Rice Brook	42	0.9	2.583	12.461	0.21	0.24	8.94	Med Residential	70	1,763	CB	10	1,586		
Upper-Vill 04	Sugarbush/Private	Rice Brook	42	0.9	1.124	6.592	0.17	0.20	7.69	Med Residential	70	802	CB	10	722		
Upper-Vill 01	Sugarbush/Private	Rice Brook	42	0.9	0.401	9.567	0.04	0.09	3.32	Med Residential	70	502	CB	10	452		
Upper-Vill 05	Sugarbush/Private	Rice Brook	42	0.9	0.735	2.861	0.26	0.28	10.63	Med Residential	70	481	CB	10	433	5,385	19.3%
Bridges	Private	Rice Brook	42	0.9	7.599	15.915	0.48	0.48	18.13	Med Residential	70	4,566	CB	10	4,109		
Upper-Vill 06	Private	Rice Brook	42	0.9	5.517	13.749	0.40	0.41	15.54	Med Residential	70	3,380	CB	10	3,042		
SB-Vill 01	Private	Rice Brook	42	0.9	5.142	13.368	0.38	0.40	14.98	Med Residential	70	3,167	CB	10	2,850		
SB-Vill 04	Private	Rice Brook	42	0.9	3.389	9.957	0.34	0.36	13.47	Med Residential	70	2,122	CB	10	1,909		
SB-Vill 02	Private	Rice Brook	42	0.9	2.805	10.918	0.26	0.28	10.63	Med Residential	70	1,836	CB	10	1,652		
SB-Vill 03	Private	Rice Brook	42	0.9	1.768	4.485	0.39	0.40	15.30	Med Residential	70	1,086	CB	10	977	14,541	52.1%
															Rice Brook Total:	27,932	100.0%
Valley House	Sugarbush	Clay Brook	42	0.9	0.354	4.375	0.08	0.12	4.64	Commercial	77	353	NONE	0	353	353	3.6%
Main LP Parking	*Sugarbush*	*Clay Brook*	*42*	*0.9*	*8.351*	*10.948*	*0.76*	*0.74*	*27.84*	*Parking*	*141*	*9,713*	*WP*	*80*	*1,943*		
22 Acre Site	*Sugarbush*	*Clay Brook*	*42*	*0.9*	*2.631*	*4.037*	*0.65*	*0.64*	*24.06*	*Parking*	*141*	*3,095*	*WP*	*80*	*619*	2,562	26.0%
South-Vill	Private	Clay Brook	42	0.9	6.388	34.721	0.18	0.22	8.15	Med Residential	70	4,476	CB	10	4,029		
Snowcreek	Private	Clay Brook	42	0.9	3.432	9.886	0.35	0.36	13.70	Med Residential	70	2,143	CB	10	1,928		
Sam Ruperts	Private	Clay Brook	42	0.9	0.957	1.995	0.48	0.48	18.21	Commercial	77	632	NONE	0	632		
South-Vill Sprt	Private	Clay Brook	42	0.9	0.812	2.533	0.32	0.34	12.80	Urban	51	374	CB	10	336	6,925	70.4%
															Clay Brook Total:	9,840	100.0%
															Grand Total:	37,772	n/a

Annual Runoff Calculated By:

R = P * Pj * Rv,

where: Rv = 0.05 + 0.9Ia

R= Annual Runoff

P= Annual Precip.

Pj= Fraction of rainfall events that produce runoff

Rv= Runoff Coefficient

Ia= % Impervious Cover

Annual Pollutant Load Calculated By:

L= 0.226*R*C*A, where

0.226 = Conversion Factor

R = Annual Runoff in Inches

C = Pollutant Concentration in mg/L

A = Site area in acres

Italics indicates contributing area to be altered by proposed Lincoln Peak Development.

All calculations subject to field verification during Spring/Summer/Fall 2003.

Precipitation value from Sugarbush EIS.

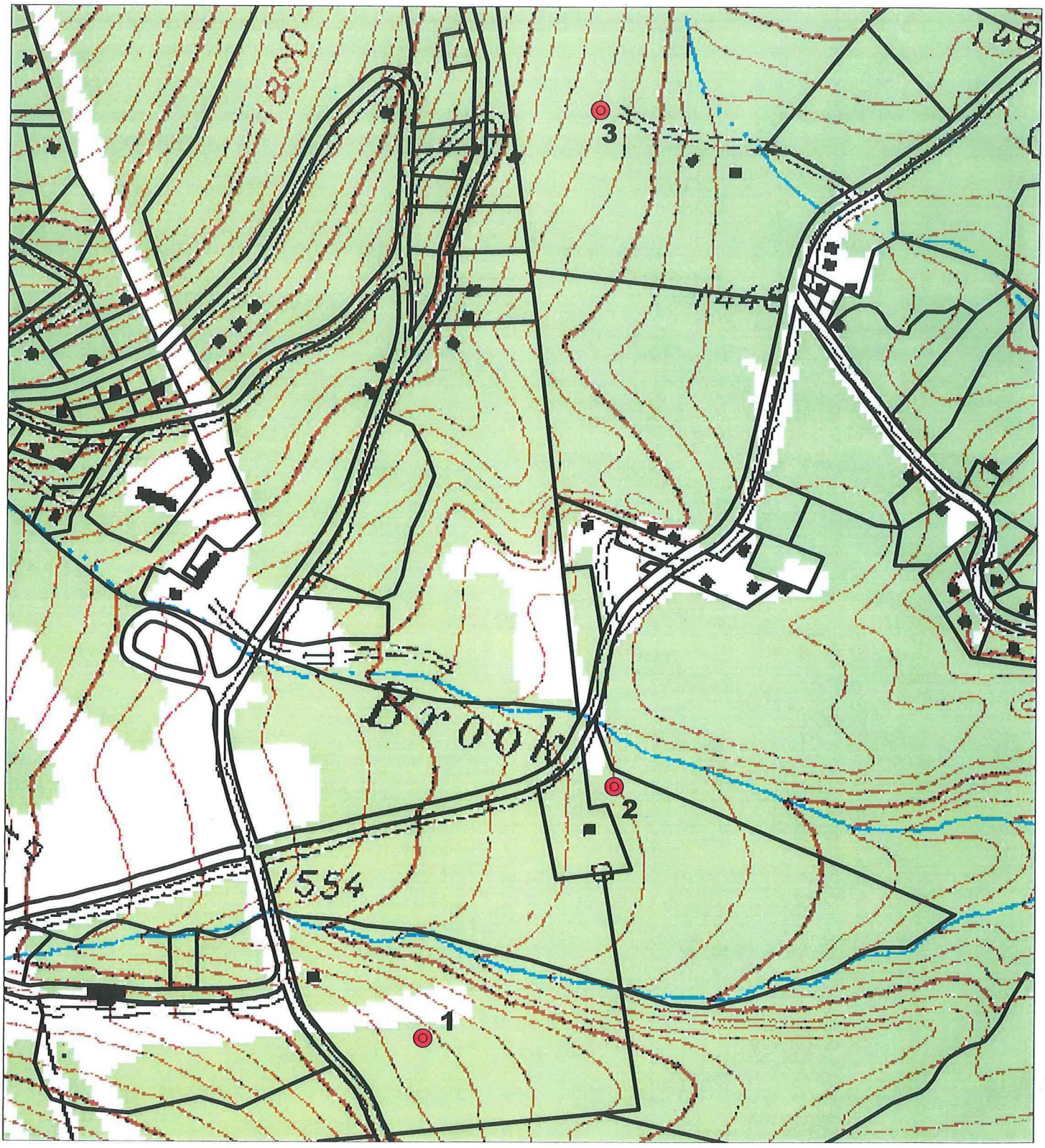
Sugarbush Lincoln Peak Development WIP Plan
TSS Percent Removal Efficiency of Stormwater Control Devices
Pioneer Environmental Associates, LLC, 02-24-03

Code	Device	% Efficiency
CB	Catch Basin	10
OGS	Oil/Grit Separator	0
SB	Sediment Basin	45
BSY	Baffled Spillway	0
RR	RipRap Swale	20
DS	Deep Sump	0
PP	Perforated Pipe Attenuator	0
GT	Grease Trap	0
RS	RipRap Swale	20
TT	Treatment Tanks	0
WP	Wet Pond (Retention)	80
OF	Overland Flow	50
GS	Grass Swale	50
SD	Municipal Storm Drain	10
DP	Detention Pond	50
IG	Infiltration Gallery	80
EDP	Extended Detention Pond	79
DW	Dry Well	87
IB	Infiltration Basin	80
LU	Lateral Underdrain	0
FS	Filter Strip	50
SF	Sand Filter	80
VS	Vortex Separator	10
UDP	Undersized Det. Pond	25

Sources:
U.S. Department of Commerce, Evaluation and Management of Highway Runoff Water Quality, August 1998
Center For Watershed Protection, The Watershed Treatment Model, Version 3.1, March 2002
Professional Judgement

Sugarbush
Lincoln Peak Base Area
Snow Storage/Sediment Disposal Locations

March 6, 2003



400 0 400 Feet

Surplus Snow Storage
Tax Map Parcel

F:\PROJECT\02085 Sugarbush LP Development\GIS\sugarbush_lp (snow)

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